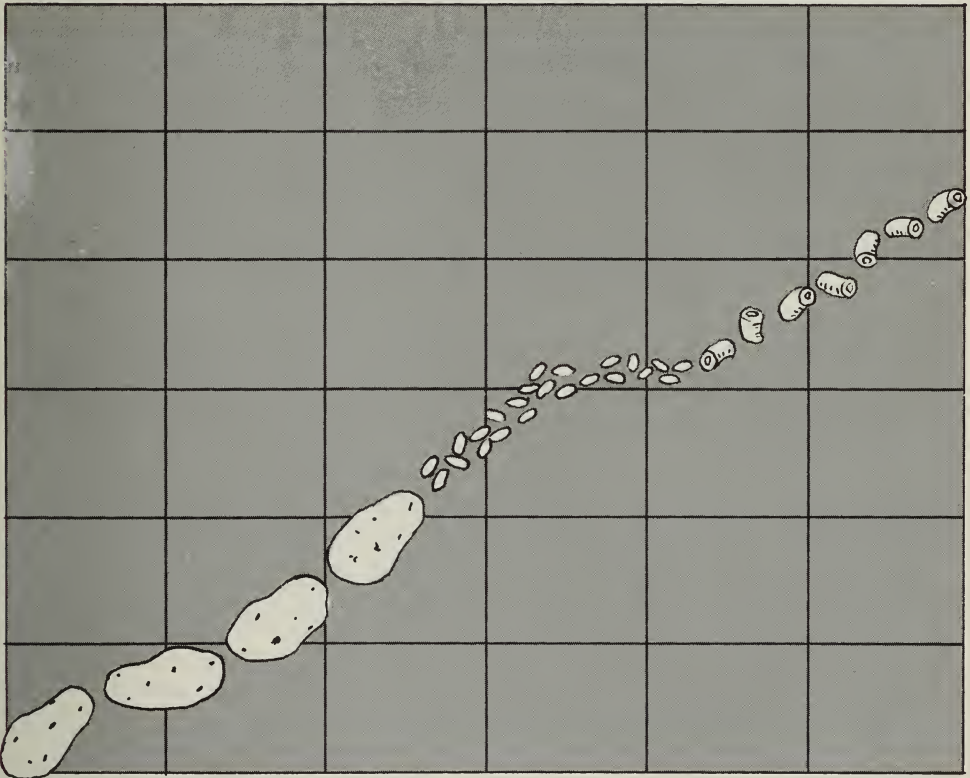




# CONSUMPTION PATTERNS FOR POTATOES, RICE, AND MACARONI IN NORTHERN CALIFORNIA, 1968



JERRY FOYTIK

ANN HERTZENDORF

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This bulletin describes survey findings concerning the prevailing use patterns for potatoes, rice, and macaroni products in Northern California during 1968, especially (1) the frequency of serving these foods in the home, (2) consumer buying habits and preferences regarding their use, and (3) consumer attitudes toward them. Attention is directed toward convenience products prepared from these three foods.

## THE AUTHORS:

Jerry Foytik is Professor of Agricultural Economics and Agricultural Economist in the Experiment Station and on the Giannini Foundation, University of California, Davis.

Ann Hertzendorf was, at the time of this study, Lecturer in Consumer Economics and Assistant Specialist in the Experiment Station and on the Giannini Foundation, University of California, Davis.

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# CONSUMPTION PATTERNS FOR POTATOES, RICE, AND MACARONI IN NORTHERN CALIFORNIA, 1968<sup>1</sup>

## INTRODUCTION

Food consumption patterns are not static. The types of foods people use and their method of preparation constantly change. A major change in the United States during recent years has been the acceptance and use of ready-to-cook and precooked foods, thereby starting some basic adjustments in the structure of the food industry and in the kinds of food products and services offered consumers.

Consumption trends for basic foods have been studied to gain insight into and permit prediction of food-use patterns. Various theories are offered to explain increases or decreases in the use of certain foods. Such explanations are based on historical consumption patterns and on how supply and demand for specific foods is affected by various socioeconomic factors such as income level and distribution, prices and supply of competitive products, quality factors, cultural and religious food preferences, and degree of urbanization.

For our market supply system for food to function effectively, all sectors of the food industry must recognize and even anticipate any changes in food-use patterns. To improve the operation of our market supply system, we need to understand the changes that occur in use patterns and the factors producing them.

Potatoes, rice, and macaroni products have previously been found to be staple items in diet patterns generally prevailing in the United States. They are familiar to most consumers and are now available in many different forms. Consumers' willingness to use these familiar foods in processed and convenience forms may indicate their attitudes toward trying and

adopting other new or processed products, hundreds of which appear in food stores each year. Knowledge concerning the variables that appear to influence consumers' purchasing decisions for the foods under study should be helpful to all sectors of the food industry.

### Scope of the study

This report describes our findings about the prevailing purchase and use patterns for potatoes, rice, and macaroni products in Northern California during 1968. Specifically, attention is focused on (1) the frequency of serving potatoes, rice, and macaroni products<sup>2</sup> in the home, (2) consumer buying habits and preferences regarding the use of these foods, and (3) consumer attitudes toward them. A considerable part of the study deals with convenience products made from these three foods.

The information presented is based upon material collected by interviews made at 1,192 California households. Our survey was limited to the nonrural area of the State north of Tehachapi Mountains and west of the Sierra Nevada foothills. Figure 1 shows the geographic location of the survey cities. The completed surveys were grouped for analysis into three geographic areas representing different urbanization segments of Northern California. These included 421 (35.3 per cent) in the five Bay Area counties, 341 (28.6 per cent) in four large inland cities (Sacramento, Stockton, Fresno, and Bakersfield), and 430 (36.1 per cent) in 37 small cities.

<sup>1</sup> Submitted for publication June 8, 1970.

<sup>2</sup> In this study, potato refers to the so-called "Irish" or white potato, excluding the sweet potato and yam; rice denotes the milled or polished grain from the rice plant; and macaroni products include all paste foods commonly known as macaroni, spaghetti, noodles, etc.



Fig. 1. Location of Survey Cities.



A sample of households was drawn randomly within each survey city. These were interviewed during October–November 1968. To provide a basis for discovering differences in use patterns among consumer groups, the questionnaire inquired about the household<sup>3</sup> as well as about the household's use of potatoes, rice, and macaroni products.

### Some assumptions

Potatoes, rice, and macaroni have relatively high rates of per-capita consumption in different parts of the world and in different cultures. Historically, rice is consumed in large quantities by Oriental people, macaroni products by people of Italian origin, and potatoes by other Europeans. Food-use patterns also differ among various cultural and ethnic groups in the United States. New immigrants to the United States may adopt the existing general diet pattern or they may cling to their traditional ways for some time, even for generations. For example, macaroni consumption is highest in the Northeastern United States where many people of Italian descent are located (U. S. Department of Agriculture, 1965a).

Gray, *et al.* (1954) hypothesized that we must consider the influence of country of origin of our immigrants and their food-use patterns when we study changes in potato consumption. Hence, they would argue that the decrease of 50 per cent in the per-capita consumption of potatoes during the past sixty years was related to a curtailment in the number of immigrants coming from Germany, Ireland, and the Slavic countries where potatoes had been their main food. They also believed that the carry-over of the tradition of high potato consumption among recent immigrants and the descendants of earlier immigrants has kept potato consumption from declining even further.

M. K. Bennett (1941) proposed a potato-cereal ratio as one measure of economic development. The ratio described an evolutionary process wherein a nation that survives almost entirely on potatoes has a

low level of development; as economic growth occurs, people will consume more wheat products and less potato products; with further economic growth, wheat or cereal products will become the mainstay of the diet and per-capita consumption of potatoes will decline still further; and in the most advanced stage of economic growth, both wheat products and potatoes are included in a varied diet but in smaller amounts.

On this basis, the United States would be classified in the most advanced stage of economic development. Both potatoes and cereals are integral parts of the diet, but neither is its primary basis. This fact, coupled with the diversified cultural background of our people, might account, in part, for the varied patterns in the use of these foods. Furthermore, if we accept this explanation, then we can expect a greater use of both processed potatoes and grain products, since these processed foods may add variety and interest to our diets rather than merely serving as an inexpensive source of carbohydrates.

Food growers and processors try to increase the consumption of their products. One way of achieving this aim is by inducing low-consumption families to use foods they traditionally do not use by preparing such foods in different forms. Many consumers are willing to try new foods and may incorporate them into their diets if the foods are attractively presented, convenient to use, and fit into existing consumption patterns. The receptivity of consumers to new food products usually lessens the risk of food retailers who are willing to stock new food products as one method of competing for customers and sales. Processed potato, rice, and macaroni products are among the hundreds of new products offered consumers in an attempt to change traditional food-use patterns, to increase sales to present users, and to induce nonusers to buy the new processed items.

A shift in consumption from a fresh product to its processed forms is of particular interest and importance to the po-

<sup>3</sup> Households were described in terms of location, ethnic background, education, income, family size, age, occupation, and employment status. The meanings of these terms adopted for this survey are given in Appendix A. Appendix B describes the consumer survey. The detailed data gathered appear in the tables listed in Appendix C.

tato industry. The total consumption of potatoes would be altered, of course, only to the extent that more or less potatoes are needed for both fresh and processing markets. If the processed potatoes are easily stored, potato supply from a good year can be carried over into a year of low production. Some marketing costs may be reduced through easier handling and transporting of the processed products rather than the more bulky raw product. Parts of the crop that are not suitable for the fresh market because they are not uniform in size or shape may be processed, often bringing higher total and net returns to the growers. The consumer will be able to choose between the fresh or processed product depending on the relative prices, qualities, and supplies of the fresh and processed items.

### Consumption trends

Potatoes, grown commercially in all fifty states, are now available at retail in about 70 processed forms. Yet per-capita consumption has had a strong downward trend during the twentieth century until about fifteen years ago when the decline became less pronounced. Figure 2 suggests that the case of potatoes is not exceptional. For example, consumption of flour and cereal products decreased more—a decline of 40 per cent since 1925 compared to 30 per cent for potatoes.

During the past decade, the use of potatoes changed sharply (see figure 3). Fresh consumption decreased by one-eighth from 8 million to 7 million tons, while use in processing outlets increased sharply from 1½ million to almost 5 million tons. Thus consumption of processed potatoes rose from 16 to 41 per cent of the food use of potatoes. Consumers were increasingly turning to processed potato products. A similar shift from fresh to processing outlets took place in the fruit and vegetable industry during and immediately after World War II.

Rice is also a major food staple in many areas of the world. The United States is one of the major rice-producing countries. Most of the rice is grown in five states: Arkansas, Louisiana, Mississippi, Texas, and California. Over one-half of the crop

is exported and about one-quarter, mostly the long-grain varieties, is consumed domestically. The remainder is used for seed, in brewing, and in cereal manufacturing (U. S. Department of Agriculture, 1968b).

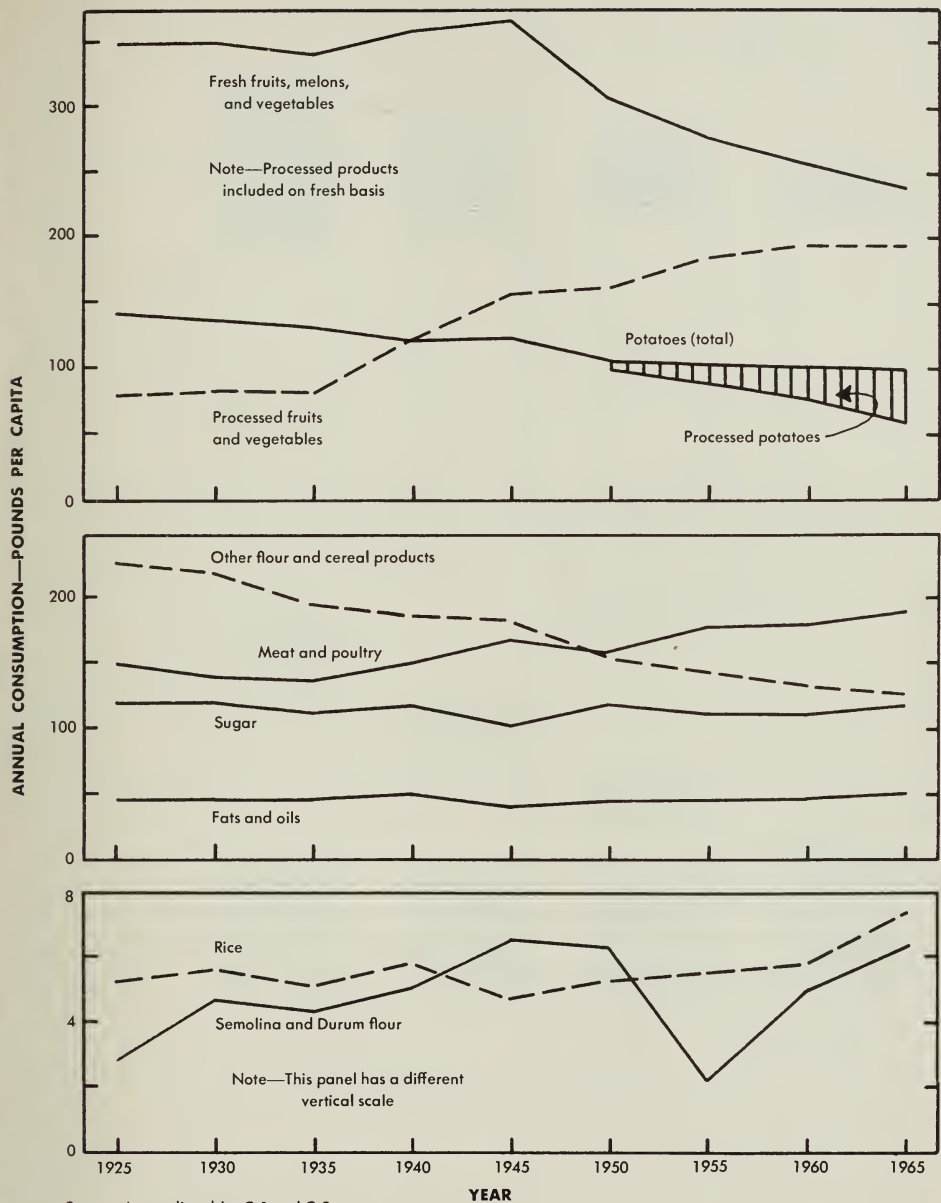
Civilian per-capita consumption of rice averaged 7.4 pounds per year in 1910–1920, fluctuated about a long-term average of 5.4 pounds during 1925–1960, and then increased to over 7 pounds for recent years (Appendix table C-1). The current increase coincides with the rice industry's effort to increase rice usage in American homes by marketing a large number of rice specialty products.

Inasmuch as there are no good statistics on the production and consumption of macaroni, spaghetti, and noodle products, it is necessary to make estimates based on consumption of durum and semolina flour, which is not used extensively for products other than paste foods. These products were made primarily from durum and semolina flour until the early 1950's but since then have used other flours also in blends, especially during of years of low domestic production of durum wheat. This means that the consumption of macaroni, spaghetti, and noodle products probably increased (on a trend basis) for the entire period since 1925 rather than dropping sharply as suggested by the bottom panel of figure 2.

Recently, paste foods have been in greater demand as part of one-dish convenience products. Noodle- and macaroni-based casserole and side-dish items have been offered in retail food markets in a wide variety of forms. Consumer acceptance of these new products has increased the overall consumption of paste foods. Moreover, the supermarket trade is forecasting a further fast growth in the sale of such new convenience items (Bennett, 1968).<sup>4</sup>

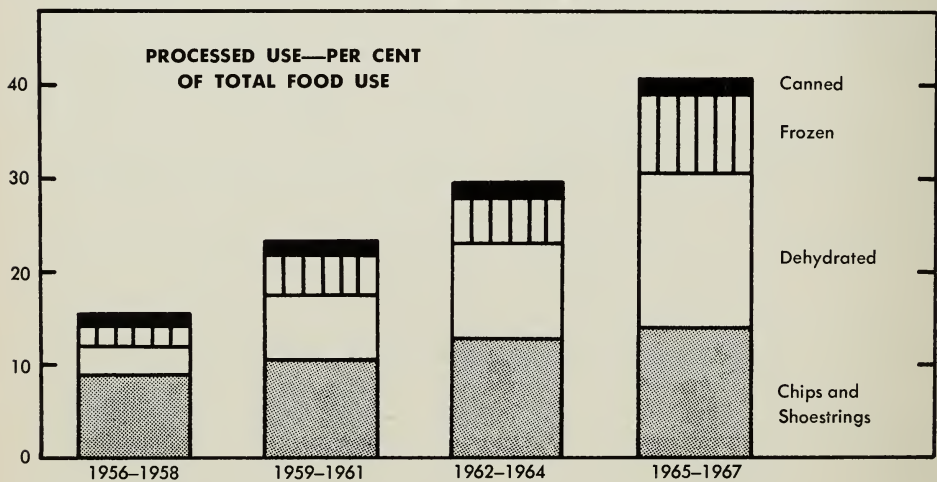
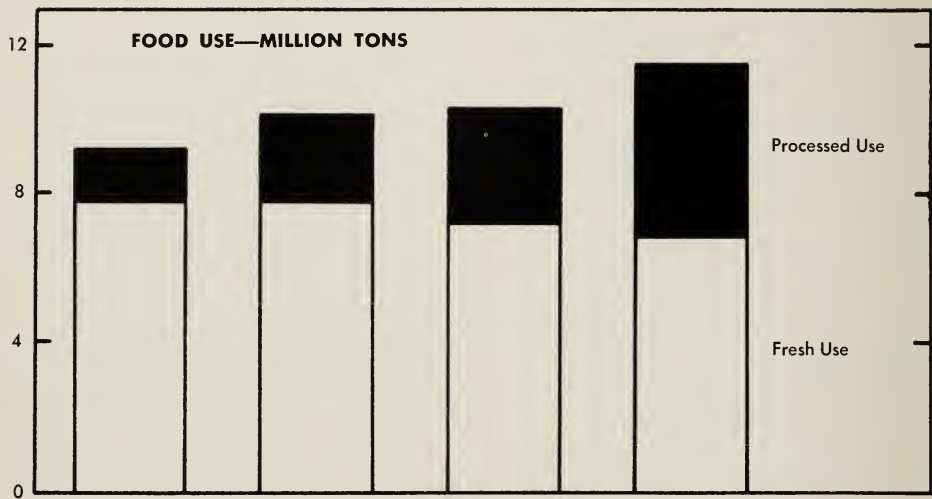
Thus, there has been a considerable increase during the past 10 or 15 years in the use of processed potatoes, rice specialty products, and convenience items made from paste foods. Apparently this expansion has served (at least, in part) to check the downward trend in potato consumption and to increase the use of rice and macaroni products.

<sup>4</sup> A convenience food is a food product available to consumers at retail that embodies a flavor-variety feature or a timesaving factor because it is premeasured or semiprepared.



Source: Appendix tables C-1 and C-2.

Fig. 2. U. S. Per-Capita Consumption of Certain Foods, 1925-1965, Pounds Per Year.



Source: Appendix table C-2.

**Fig. 3. Food Uses of U. S. Potatoes, 1956-1967.**



## MAJOR FINDINGS

Almost all of the survey households (99 per cent) include potatoes in their basic diet. Overwhelmingly, they prefer using fresh to processed potatoes although this food is available in many different processed forms. Two-thirds of the families serve baked or mashed potatoes more frequently than any other style of potatoes. They have a slight preference for baked over mashed potatoes.

Bay Area families prefer the red potato for boiling and the California long white for other uses. Other survey families select long white and russet potatoes with equal frequency for French fries and the russet for other preparations. However, an appreciable number are not aware that different varieties are better suited for some uses than for others. The choice of variety is not considered important by 10 per cent of the homemakers when baking potatoes and by 17 per cent when they serve potatoes in other forms.

Almost one-half of the homemakers (43 per cent) consider freedom from defects to be more important than any other factor when purchasing fresh potatoes. They rank price and intended use (the next two factors) much lower (18 and 12 per cent).

Generally, the respondents consider potatoes to be not fattening or only moderately so. However, one-sixth of them say that potatoes are very fattening—a conclusion contradicted by nutrition research. Apparently, the public needs more information about the caloric and nutritional of potatoes.

Sixty per cent of the households interviewed reported that they serve rice as a change from potatoes, 26 per cent substitute paste foods, and 14 per cent, other foods. Thus, many families seem to prefer a starch in their meal patterns and commonly use rice when making a substitute for potatoes. Rice was the preferred substitute relatively more often in households where family income was high or the wife had more formal education, perhaps indicating a greater awareness of ways for achieving greater variety in the diet.

Potatoes were served twice as frequently as rice in the households surveyed and three times as often as macaroni products.

All three foods were served more frequently by Mexican-American households, those with large families, those in the low income group, and those where the main earner was employed in a service or labor occupation.

Households in the higher income group and in the professions served potatoes, rice, and macaroni products less often than the other groups studied. One survey also disclosed a greater propensity among these households to buy convenience products made from these three basic foods. This tendency supports the widely held thesis that those who have an ample supply of food are likely to seek greater variety in their food purchases. Food becomes more than a way to provide needed nutrients, it is part of a desired style of life. Many prepackaged and convenience foods are associated with elegance and leisurely dining rather than "merely" eating. These "elegant" forms are available at a cost and in an easy-to-prepare form which saves the homemaker time and effort.

The coming decade will see many new families formed from our currently large teenage population. Generally, these new households will have a higher income level than their parents, more formal education, and proportionately more employed in the "white collar" occupations. Many of them have already been introduced to a wide variety of easy-to-prepare foods in restaurants and in their parental homes. They accept many of these convenience and processed foods and probably will continue to purchase them and to try others that become available for home use.

Our findings indicate that convenience foods made from potatoes, rice, and paste foods are used in many households. They are purchased considerably more frequently by families with higher income, of large size, with a husband in the "white collar" occupations, and a wife who has completed a high school education. As more households acquire these characteristics, they, too, may spend more of their food dollar for products offering more variety, elegance, and convenience.

In the light of expected demographic shifts in the population, per-capita "de-

mand" for easy-to-prepare items made from potatoes, rice, and paste foods should increase considerably. If this development occurs (as it is expected to do), the industries producing these items are likely to offer them in larger quantity (and variety) to meet the demand for variety and time-saving features expressed by the general public as well as by the institutional trade. The total consumption for these three foods, in processed and "unprocessed" forms, is likely to expand.

A word of caution seems in order, especially at this time when the American public is changing its views about many

things—sometimes rapidly and drastically. Numerous socioeconomic factors make for differences in consumer tastes and preferences. For example, the consumers' willingness to try new convenience items produced from the three basic foods considered here is also likely to lead to a willingness to try other new food products that may appear on the scene. Thus, attention must also be given to changes in availability of substitutes, relative price patterns, ideas concerning a "good" diet, and other variables affecting the total picture. Consideration of these factors is beyond the scope of this study.

## POTATOES: CALIFORNIA CONSUMPTION PATTERNS

Experiments are constantly undertaken to make the physical and quality characteristics of fresh potatoes more acceptable to consumers and processors. Information about consumers' selection and use of potatoes as well as processors' requirements for manufactured products can aid growers in adapting their crops better to market demands. While our primary concern in this portion of the study is with consumer purchasing patterns for potatoes and potato products, several other investigations indicate that consumers' choices are related to certain quality characteristics of the available products. Some varieties of fresh potatoes are more suitable for certain types of household preparation than are other varieties because of their different moisture and solid contents. Best results are achieved by purchasing the potato most suited to a particular cooking method. Therefore, we asked respondents how they usually served potatoes in their households, which potato variety they used for different cooking methods, and whether they used fresh or processed potato products in preparing meals. To increase our understanding of consumer knowledge concerning fresh potatoes, we asked about the factors that mattered in their choice

of potatoes, and whether or not they think potatoes are fattening.

### Misinformation and calorie counters

In a country with an overly abundant food supply and a relatively high income level, food fads and fashions can determine the success and failure of food firms. In recent years, the American public has become very interested in dietary matters and has tried to restrict the intake of starches and carbohydrates, to conform with its ideas (frequently nutritionally incorrect) concerning a "good" diet.

Some misconceptions about potatoes were disclosed in our survey of California households. We asked the respondents, "Do you think potatoes are fattening?"<sup>5</sup> Almost 11 per cent of the replies were "don't know." Two-thirds of the respondents who gave opinions considered potatoes to be fattening—17 per cent said "very fattening," and 51 per cent "moderately flattening."

The pattern of replies did not vary much according to the respondent's place of residence—Bay Area, inland cities, or small cities. However, the replies varied substantially when families were grouped by demo-

<sup>5</sup>The term "fattening" is used in its colloquial sense. Any food is "fattening" if eaten in excess of caloric needs. On a comparative basis, potatoes contain more calories than the same quantity (in terms of weight) of most fruits and vegetables but much less than fats, oils, and sugars.

TABLE 1  
DO YOU THINK POTATOES ARE FATTENING?

Household characteristic	Very fattening	Moderately fattening	Not fattening	With opinion	Without opinion*	Total replies
<b>Location</b>						
Bay Area.....	18.1	52.2	29.7	88.1	11.9	420
Inland cities.....	17.1	49.3	33.6	89.4	10.6	340
Small cities.....	17.5	50.4	32.1	90.5	9.5	430
Total.....	17.6	50.7	31.7	89.3	10.7	1,190
<b>Income level</b>						
I (Under \$3,000).....	18.1	47.0	34.9	80.6	19.4	103
II (\$3,000 to \$5,499).....	20.1	42.5	37.4	89.1	10.9	156
III (\$5,500 to \$6,999).....	15.8	55.1	29.1	90.0	10.0	141
IV (\$7,000 to \$9,999).....	20.2	55.3	24.5	90.1	9.9	253
V (\$10,000 to \$14,999).....	15.7	54.5	29.8	92.2	7.8	269
VI (\$15,000 and over).....	11.5	54.0	34.5	92.6	7.4	122
Total.....	17.2	52.2	30.6	89.8	10.2	1,044
<b>Education of wife</b>						
Elementary.....	22.4	34.2	43.4	79.2	20.8	96
High school.....	30.1	39.8	30.1	86.7	13.3	165
HS graduate.....	17.4	54.7	27.9	91.1	8.9	460
College.....	12.3	57.1	30.6	92.8	7.2	334
Total.....	18.0	51.6	30.4	89.9	10.1	1,055
<b>Ethnic group</b>						
Oriental.....	20.8	62.5	16.7	72.7	27.3	33
Negro.....	21.8	43.6	34.6	82.1	17.9	95
Mexican.....	30.6	36.7	32.7	76.5	23.5	64
Nonwhite.....	24.5	44.4	31.1	78.6	21.4	192
White.....	16.6	51.9	31.5	91.6	8.4	961
Total.....	17.8	50.8	31.4	89.4	10.6	1,153

\* Combination of the three replies: "Don't know," "No opinion," and "Other."

graphic factors (table 1).<sup>6</sup> The proportion of respondents not expressing an opinion about the "fattening" effect of potatoes was much greater for nonwhite than white families and for those with lower incomes or less education. Relatively more of the respondents with opinions considered potatoes to be fattening (either very or moderately) if their education continued beyond elementary school or if the family income was in the middle brackets.

### Selection of potatoes

When asked, "Which factor matters most to you in selecting fresh potatoes?" (table

2), 43 per cent of the sample indicated they wanted their potatoes to be free from defects. Another 44 per cent listed one of four other factors: price (18 per cent), intended use (11 per cent), cleanliness (8 per cent), and package (7 per cent).

Nonwhites and respondents with limited education and low family income attached less importance to freedom from defects and gave more weight to price than did the average interviewee.<sup>7</sup> For example, price was almost as important as freedom from defect among nonwhite families—32 vs. 34 per cent.

Generally, our survey consumers were much concerned about quality of the po-

<sup>6</sup> Each text table reports some of the data gathered during our survey of 1,192 households in Northern California. Its title is in the form of a question approximating one of those asked of respondents. The appendices contain information in greater detail.

<sup>7</sup> The lowest income group was not as concerned about price as the others. This strange result can be explained by the fact that more than half the households in this income group

TABLE 2  
WHICH ONE FACTOR MATTERS MOST TO YOU  
IN SELECTING FRESH POTATOES?

Household characteristic	Defect free	Price	Intended use	Cleanliness	Pack-age*	Other†	Total replies
							Number
<i>Per cent of replies</i>							
<b>Location</b>							
Bay Area.....	44.4	14.8	11.2	7.2	10.5	11.9	419
Inland cities.....	38.2	18.3	12.7	7.7	4.2	18.9	338
Small cities.....	44.5	20.0	11.0	7.9	6.3	10.3	429
Total.....	42.7	17.7	11.6	7.6	7.1	13.3	1,186
<b>Income level</b>							
I (Under \$3,000).....	30.1	15.5	11.7	16.5	9.7	16.5	103
II (\$3,000 to \$5,499).....	41.2	25.8	7.1	7.1	5.2	13.6	155
III (\$5,500 to \$6,999).....	48.2	18.4	8.5	6.4	7.9	10.6	141
IV (\$7,000 to \$9,999).....	42.7	16.2	12.6	7.9	8.0	12.6	153
V (\$10,000 to \$14,999).....	49.6	14.5	12.3	5.2	6.8	11.6	268
VI (\$15,000 and over).....	44.6	9.9	20.7	6.6	3.3	14.9	121
Total.....	44.0	16.7	12.0	7.6	6.8	12.9	1,041
<b>Education of wife</b>							
Elementary.....	31.2	25.0	10.4	9.4	5.2	18.8	96
High school.....	43.9	22.0	8.5	11.0	4.2	10.4	164
HS graduate.....	43.0	17.6	11.5	6.3	8.8	12.8	460
College.....	45.4	15.0	13.8	5.1	7.2	13.5	333
Total.....	42.8	18.2	11.7	6.9	7.2	13.2	1,053
<b>Ethnic group</b>							
Oriental.....	33.3	21.2	9.1	3.0	18.2	15.2	33
Negro.....	35.8	33.7	8.4	11.6	3.1	7.4	95
Mexican.....	30.2	34.9	6.4	11.1	7.9	9.5	63
Nonwhite.....	33.5	31.9	7.9	10.0	7.3	9.4	191
White.....	44.4	14.8	12.4	7.1	7.3	14.0	958
Total.....	42.6	17.6	11.7	7.6	7.3	13.2	1,149

\* Combination of two factors: "Whether they are packaged or not" and "The size of the package." Replies were about equally divided between these two factors.

† Combination of "None of these" and "Other."

tatoes brought. Earlier studies reported similar results. A survey conducted by the U. S. Department of Agriculture (1948) revealed that homemakers looked for potatoes that had a smooth skin, clean surface, few deep eyes, and no spots or blemishes. Libeau's report (1951, pp. 14-17) arrays factors affecting consumers' selection of fresh potatoes in the order of quality, medium size, and price.

Some varieties of fresh potatoes are more suitable for certain food preparations than others. Other studies report that consumers prefer to purchase one all-purpose

potato rather than to buy a different variety for each intended use. If they purchased a special-purpose potato, it was for baking (U. S. Department of Agriculture, 1948, p. 4).

California consumers generally have a choice of four fresh potato varieties: round white, long white, russet, and red potatoes. The long white and russet varieties are used most often, largely because they are more available. To learn more about consumers' buying methods, we asked questions designed to test respondents' knowledge of the four varieties and their cook-

consisted of families whose main earner was retired, unemployed (maybe merely between jobs), a student, or a homemaker. Presumably many of these are supplementing current income by other sources of money to cover living costs and are continuing their preexisting expenditure patterns. Interpretation of data in some of the other tables may need to be modified also to take into account the unusual composition of families in the lowest income group.



TABLE 3

IF YOU WANT TO SERVE POTATOES IN EACH OF THE FOLLOWING FORMS,  
WHICH VARIETY OF FRESH POTATO WOULD YOU SELECT?

Use and location	Russet	Long white	Round white	Red	Does matter	Doesn't matter	Don't know	Don't serve	Total replies
	<i>Per cent of replies with preference</i>				<i>Per cent of total replies</i>				<i>Number</i>
<b>Baked</b>									
Bay Area.....	42.5	48.9	4.9	3.7	79.0	12.8	3.6	4.6	414
Inland cities.....	66.3	20.7	10.4	2.6	82.3	7.9	2.8	7.0	328
Small cities.....	58.3	30.9	6.2	4.6	86.5	9.8	1.4	2.3	427
Total.....	55.2	34.2	6.9	3.7	82.6	10.3	2.6	4.5	1,169
<b>Mashed</b>									
Bay Area.....	36.0	48.8	9.0	6.2	69.1	17.7	4.6	8.6	418
Inland cities.....	50.2	31.6	15.2	3.0	80.5	12.0	3.9	3.6	334
Small cities.....	51.4	36.1	8.7	3.8	75.5	19.5	1.0	4.0	425
Total.....	46.0	38.9	10.8	4.3	74.7	16.7	3.1	5.5	1,177
<b>Boiled</b>									
Bay Area.....	25.1	26.7	16.4	31.8	72.2	16.4	3.6	7.8	414
Inland cities.....	39.1	28.6	17.7	14.6	80.4	9.4	3.0	7.2	331
Small cities.....	43.4	29.4	14.4	12.8	75.3	17.2	3.3	4.2	425
Total.....	35.9	28.3	16.0	19.8	75.7	14.7	3.3	6.3	1,170
<b>Potato salad</b>									
Bay Area.....	26.1	42.8	13.6	17.5	67.5	14.9	4.8	12.8	415
Inland cities.....	42.4	33.6	16.8	7.2	72.6	13.4	3.3	10.7	328
Small cities.....	43.9	34.5	11.0	10.6	72.6	17.3	2.1	8.0	427
Total.....	37.4	37.1	13.5	12.0	70.8	15.4	3.4	10.4	1,170
<b>French fried</b>									
Bay Area.....	32.8	55.4	6.2	5.6	46.7	14.6	5.0	33.7	418
Inland cities.....	43.5	44.5	9.0	3.0	60.4	12.1	2.7	24.8	331
Small cities.....	42.8	47.1	5.7	4.4	54.1	13.0	3.8	29.1	423
Total.....	39.9	48.9	6.9	4.3	53.3	13.3	3.9	29.5	1,172

ing qualities. The varieties were listed on the questionnaire but were not described for the respondents. Their preferences are significant because they reveal a knowledge about cooking qualities that conforms closely to research findings.<sup>8</sup>

Table 3 summarizes replies to the inquiry about respondents' varietal preferences in fresh potatoes. Preferences were expressed by most homemakers (83 per cent) when they bake potatoes, by three-quarters (71 to 76 per cent) for mashing, boiling, and potato salad, and by only one-half (53 per cent) for french frying. Respondents to whom variety mattered had a definite preference for russet and long white potatoes, especially for baking, mash-

ing, and french frying. Round white and red potatoes were preferred by 36 per cent for boiling and 25 per cent for potato salad.

Bay Area housewives had a different pattern of varietal preferences. They selected long white over russet potatoes for all five uses, whereas the reverse situation tended to prevail in the other areas. We have no explanation for this considerable variation.

### Serving potatoes

Two-thirds of the sample households indicated a preference for baked and mashed potatoes. Boiled potatoes were served most frequently in 13 per cent of the households, french fries in 7 per cent, and other

<sup>8</sup> The russet is a general-purpose "old" potato. The round white, another "old" potato, is best for boiling and french fries. Long whites, tubular "new" potatoes, are suited for boiling, mashing, and potato salad. The red potato, a block round "new" potato, is better for boiling than for other uses.

forms of potatoes in 13 per cent. Only 12 respondents (1 per cent of the sample) indicated using potato chips more frequently than any other form of potatoes. Possibly chips were not mentioned more frequently because many respondents regard them as a snack rather than a staple food or may not even consider chips as a potato product.

These findings differ from those of earlier studies, mainly by indicating a higher preference for baked potatoes by today's Northern Californians and a lower preference for boiled potatoes. A 1948 survey of U. S. households reported that the most frequently served form of potatoes was mashed, boiled, fried, baked, and creamed—in that order. Homemakers in Los Angeles reported that the proportion of potatoes used for baking was about the same

as for mashing and boiling (U. S. Department of Agriculture, 1948, pp. 16-17). Studies in 1953 and in 1957 reported that potatoes were served mainly in the mashed or boiled form (LeBovit and Clark, 1956, p. 18). A 1961 U. S. Department of Agriculture study (Harp and Dunham, 1961, p. 1) reported that mashed potatoes represented 34 per cent of the home consumption of potatoes. Apparently the relatively high preference for mashed potatoes provided dehydrators with an excellent opportunity to market potato granules and flakes.

Preference patterns for our survey households varied substantially among households located in different areas, with different income and educational levels, or in different ethnic groupings (see table 4). The major difference geographically was

TABLE 4  
WHEN YOU HAVE POTATOES AT HOME, WHAT ONE FORM  
DO YOU SERVE MOST FREQUENTLY?

Household characteristic	Baked*	Mashed*	Sub-total	Boiled*	French fried	Potato chips	Other	Total replies
								Number
<i>Per cent of replies</i>								
<b>Location</b>								
Bay Area.....	43.5	26.8	70.3	12.4	5.7	1.4	10.2	421
Inland cities.....	32.0	31.4	63.4	10.8	8.5	1.8	15.5	341
Small cities.....	29.8	36.5	66.3	15.6	6.3	0.0	11.8	430
Total.....	35.2	31.7	66.9	13.1	6.7	1.0	12.3	1,192
<b>Income level</b>								
I (Under \$3,000).....	18.6	35.1	53.7	16.2	9.7	0.0	20.4	103
II (\$3,000 to \$5,499).....	23.2	32.2	55.4	17.7	11.5	0.0	15.4	156
III (\$5,500 to \$6,999).....	29.2	28.5	57.7	14.7	7.8	1.4	18.4	141
IV (\$7,000 to \$9,999).....	35.3	34.5	69.8	11.6	7.1	0.4	11.1	253
V (\$10,000 to \$14,999).....	43.5	32.7	76.2	11.5	4.1	2.2	6.0	269
VI (\$15,000 and over).....	56.7	25.5	82.2	8.8	2.5	0.8	5.7	122
Total.....	35.6	31.9	67.5	13.0	6.8	1.0	11.7	1,044
<b>Education of wife</b>								
Elementary.....	16.9	33.5	50.4	15.3	11.4	0.0	22.9	96
High school.....	23.1	37.1	60.2	12.5	7.9	0.6	18.8	165
HS graduate.....	36.1	31.7	67.8	13.3	7.2	1.1	10.6	460
College.....	48.9	26.8	75.7	11.1	3.9	1.8	7.5	334
Total.....	36.4	31.2	67.6	12.7	6.6	1.1	12.0	1,055
<b>Ethnic group</b>								
Oriental.....	38.9	17.6	56.5	13.1	3.0	6.1	21.3	33
Negro.....	18.2	35.1	53.3	14.0	16.9	0.0	15.8	95
Mexican.....	11.1	37.8	48.9	10.3	15.7	0.0	25.1	64
Nonwhite.....	19.4	33.0	52.4	12.7	14.1	1.0	19.8	192
White.....	38.6	31.1	69.7	13.3	5.2	1.0	10.8	961
Total.....	35.4	31.4	66.8	13.2	6.7	1.0	12.3	1,153

\* Replies "Mashed, baked as frequently" and "Mashed, baked, boiled as frequently" distributed equally among the forms indicated.

in the preference for baked and mashed potatoes. In the Bay Area, baked and mashed potatoes were served most frequently by 43 and 27 per cent of the households compared to 31 and 34 per cent in other areas.

There was a pronounced preference for baked potatoes with increases up the income and educational scale. For example, baked potatoes were the preferred form of serving potatoes in 17 per cent of the households where the wife's education stopped at the elementary school and 49 per cent if she attended college. Preferences for mashed and boiled potatoes declined from 49 to 38 per cent and those for french fries and other potatoes from 34 to 13 per cent as the wife's education went from elementary school to college attendance. A similar shift was indicated by changes in income.

On an ethnic basis, some differences were pronounced while others were negligible. Baked potatoes were the form served most frequently by 39 per cent of the white families and by 15 per cent of the Negro and Mexican-American families; french fries by 5 and 16 per cent, respectively. Mashed and boiled potatoes were pre-

ferred by 31 and 36 per cent, boiled potatoes by 13 and 13 per cent, and potatoes in other forms by 12 and 20 per cent, respectively.

## Substitutes for potatoes

Bennett (1941) stated that as a nation becomes more affluent its food pattern shifts away from a heavy reliance on potato or cereal products toward greater variation in its diets. This variation may be achieved in many ways. One of the most successful is to use modern technology for creating new products out of the original basic raw materials. For example, the potato industry would like to have consumers who are looking for more variety in their meal patterns shift from one form of potato to another form rather than to other products. The rice industry is trying to increase consumer use of its products by marketing many specialty rice products, thereby giving the consumer a wider choice in using and serving rice. Likewise, the macaroni and noodle industry is encouraging creative menu planning and making available to consumers more processed dinner products with a macaroni or noodle basis.

TABLE 5  
AS A CHANGE FROM POTATOES, WHICH FOOD WOULD YOU SERVE?

Household characteristic	Rice	Macaroni or spaghetti	Noodles	Salad or vegetable	Other food or nothing	Total replies
	<i>Per cent of replies</i>					<i>Number</i>
<b>Location</b>						
Bay Area .....	69.0	10.7	9.6	5.0	5.7	419
Inland cities .....	52.8	22.1	5.3	14.2	5.6	339
Small cities .....	56.9	23.1	7.2	8.8	4.0	429
Total .....	60.0	18.4	7.5	9.0	5.1	1,187
<b>Income level</b>						
I (Under \$3,000) .....	59.2	19.4	6.8	7.8	6.8	103
II (\$3,000 to \$5,499) .....	53.8	25.6	4.5	9.0	7.1	156
III (\$5,500 to \$6,999) .....	51.1	28.4	11.3	7.1	2.1	141
IV (\$7,000 to \$9,999) .....	60.1	15.8	5.9	13.8	4.4	253
V (\$10,000 to \$14,999) .....	62.9	15.2	7.8	8.9	5.2	269
VI (\$15,000 and over) .....	71.3	9.0	9.8	5.8	4.1	122
Total .....	59.8	18.4	7.5	9.4	4.9	1,044
<b>Education of wife</b>						
Elementary .....	60.4	18.7	4.2	11.5	5.2	96
High school .....	49.1	27.9	8.5	11.5	3.0	165
HS graduate .....	57.8	20.4	8.1	8.7	5.0	460
College .....	67.3	11.7	7.2	7.5	6.3	334
Total .....	59.7	18.7	7.5	9.0	5.1	1,055

Frequency, potatoes, rice, and macaroni products are substitutes for each other as the one starch food, frequently in addition to bread, included in many American meals; they are competitors in the American diet. Hence, we asked, "As a change from potatoes, which food would you serve?" Rice was the first choice by 60 per cent of the sample households, paste products by 26 per cent, and other foods by 14 per cent (see table 5). The preference for rice as the first substitute for potatoes is much greater in the Bay Area than elsewhere—by a larger margin than can be explained merely by the Oriental population there.

## FREQUENCY OF USE OF POTATOES, RICE, AND MACARONI

Bennett's explanation (1941) of potato-cereal consumption referred to the economic development of a nation as a whole. Within a nation as diverse as ours, individual families vary and many factors may be used to explain the differing food consumption patterns among households. A family's identity, income level, ethnic group, educational level, age, or size may affect its use of food products. The employment status of the husband, wife, or both may cause the family to set certain patterns. Meal patterns are also affected by food habits the household members acquired from their parents, their tastes and preferences, and their willingness to accept or try new products.

Within established diet patterns, some foods are so important to a family that they will be consumed daily. Others will be served occasionally and some infrequently. Potatoes and possibly rice and macaroni products are foods eaten frequently by many Californians. Variations in the use frequency among the survey households are indicated by the data reported in the tables of Appendix C. Major comparisons are given in table 6 and figure 4.

Potatoes are eaten much more often than the other two foods—3.1 times per week, on the average, compared to 1.3 for rice and 1.0 for macaroni products. The difference can be put in another way.

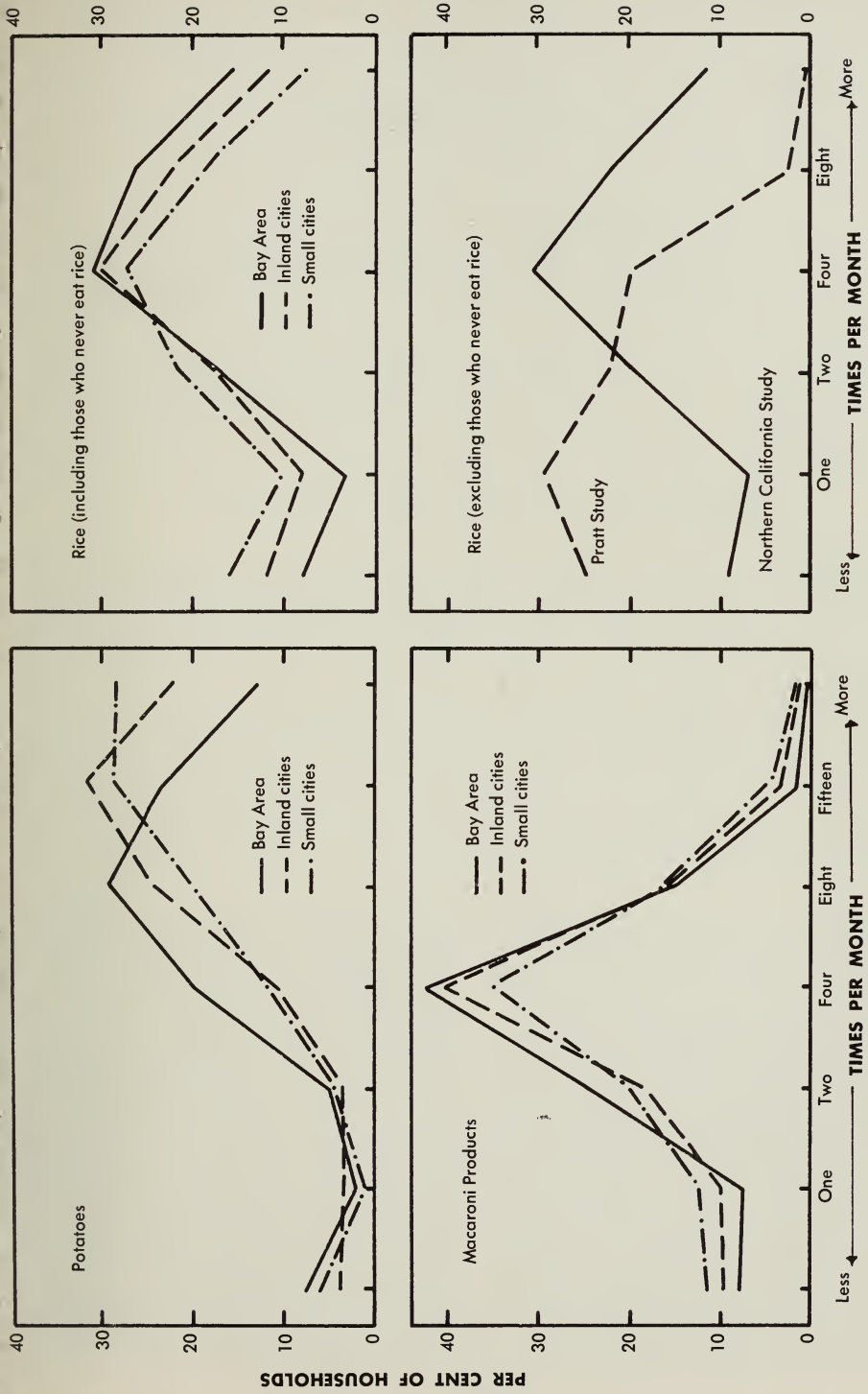
Table 5 also reveals that the choice of potato substitutes was affected by income and education within the household. Rice was chosen less often—and macaroni products more frequently—by women with only a high school education than those who did not go beyond elementary or who attended college. There is a similar curvilinear relation to income level. The reason for such choices is not clear. Possibly the explanation is largely in terms of relative prices at the lower income and education levels and in terms of a search for greater variety in dietary patterns by families on higher socioeconomic planes.

About three-quarters (73 per cent) of the sample households use potatoes at least twice a week compared to one-third (33 per cent) for rice and one-fifth (20 per cent) for macaroni products. Consumption varies in the different parts of the survey area.

This study showed that use frequency varied considerably in association with several characteristics describing the household. Generally, potatoes, rice, and macaroni products were eaten more frequently by Mexican-American families, households with large families, those with incomes below \$7,000, those where the wife's education ended before high school graduation, and those where the main earner was in a service or manual labor occupation. Families of smaller size, at higher income levels, with more formal education, and in the professional and "white collar" occupations used these foods less frequently in their diets and presumably substituted other foods for more variety. In other words, those survey families which might be put in the "blue collar" or lower socioeconomic groups used potatoes, rice, and macaroni products more frequently.

Variations in use frequency were more pronounced and regular for macaroni products than for potatoes and rice. Macaroni products were used frequently (at least twice a week) by 41 per cent of the





Source: Appendix tables C-5 and C-6.

Fig. 4. Frequency of Eating Potatoes, Rice, and Macaroni Products, Northern California, 1968, and Rice Per Pratt Study for 1957, by Percentage of Households.

TABLE 6

## HOW OFTEN DO YOU EAT POTATOES, RICE, AND MACARONI PRODUCTS?

Household characteristic	Potatoes			Rice			Macaroni products			Total replies
	Twice a week or more	Once a week	Less often	Twice a week or more	Once a week	Less often	Twice a week or more	Once a week	Less often	
	<i>Per cent of replies</i>									<i>Number</i>
<b>Location</b>										
Bay Area.....	65.1	19.9	15.0	41.1	30.9	28.0	17.1	42.3	40.6	421
Inland cities.....	78.3	10.6	11.1	32.0	30.5	37.5	21.1	40.5	38.4	341
Small cities.....	77.0	11.9	11.1	25.1	27.2	47.7	21.4	34.9	43.7	430
Total.....	73.2	14.3	12.5	32.7	29.5	37.8	19.8	39.1	41.1	1,192
<b>Income level</b>										
I (Under \$3,000).....	68.0	12.6	19.4	42.7	20.4	36.9	22.3	29.1	48.6	103
II (\$3,000 to \$5,499).....	82.0	7.7	10.3	30.1	29.5	40.4	25.0	38.5	36.5	156
III (\$5,500 to \$6,999).....	80.9	10.6	8.5	33.3	27.7	39.0	30.5	36.9	32.6	141
IV (\$7,000 to \$9,999).....	72.7	17.8	9.5	30.1	31.2	38.7	17.4	41.1	41.5	253
V (\$10,000 to \$14,999).....	70.3	16.7	13.0	26.8	32.7	40.5	14.9	42.4	42.7	269
VI (\$15,000 and over).....	66.4	17.2	16.4	36.9	32.8	30.3	10.7	45.1	44.2	122
Total.....	73.4	14.4	12.2	31.7	30.0	38.3	19.3	39.8	40.9	1,044
<b>Education of wife</b>										
Elementary.....	77.1	11.5	11.4	41.6	29.2	29.2	28.1	28.1	43.8	96
High school.....	81.8	7.3	10.9	27.3	29.1	43.6	26.1	38.8	35.1	165
HS graduate.....	76.3	15.0	8.7	26.3	33.9	39.8	20.0	42.0	38.0	460
College.....	67.7	16.4	15.9	37.4	29.7	32.9	15.9	41.3	42.8	334
Total.....	74.5	13.9	11.6	31.4	31.4	37.2	20.4	40.0	39.6	1,055
<b>Ethnic group</b>										
Negro.....	70.5	17.9	11.6	49.5	32.6	17.9	28.4	39.0	32.6	95
Mexican.....	85.9	9.4	4.7	73.4	14.1	12.5	40.6	29.7	29.7	64
Oriental.....	33.3	18.2	48.5	90.9	6.1	3.0	9.0	45.5	45.5	33
Nonwhite.....	69.3	15.1	15.6	64.6	21.9	13.5	29.2	37.0	33.8	192
White.....	74.1	14.0	11.9	26.7	30.8	42.5	17.9	39.3	42.8	961
Total.....	73.3	14.2	12.5	33.0	29.3	37.7	19.8	38.9	41.3	1,153

NOTE: For more detail, see Appendix tables C-7, C-8, and C-9.

Mexican-American families compared to 28, 18, and 9 per cent, respectively, for Negro, white, and Oriental families. The percentage increased with family size—being 11 per cent for families of one or two persons, 20 per cent for three- to four-person families, and 28 per cent for larger families. It was negatively correlated with income and education. The percentage decreased from 26 at incomes under \$7,000, to 16 at incomes of \$7,000 to \$15,000, and to 11 at higher levels. It declined from 27 if the wife had not graduated from high school, to 20 if she had, and to 16 if she attended college. The percentage was 32 for service and labor occupations and 17 for professional and clerical workers.

Potatoes had similar variations in use-

frequency patterns, although the changes were of smaller magnitude. Potatoes were eaten frequently by 86 per cent of the Mexican-American families and 74, 71, and 33 per cent, respectively, by white, Negro, and Oriental families. (Note that the order of white and Negro households was reversed.) Again, frequent use was correlated positively with household size and negatively with income and wife's education. It was higher for service and clerical workers (83 per cent) than for professional and clerical occupations (70 per cent).

A different situation prevailed for rice. Over 90 per cent of the Oriental families used rice frequently. The percentages were 73, 50, and 27, respectively, for Mexican-American, Negro, and white families.

There were a positive correlation with family size. The correlation with both education and income was U-shaped. Thus, families with a high school educated wife ate rice at least twice a week less often than those where the wife had not gone beyond elementary school or, on the other hand, had continued with college. Households where the main earner was in a service or labor occupation ate rice more often but not by as wide a margin as in the case of macaroni products or potatoes.

Pratt's inquiry (1960) into the domestic consumption of rice in the United States was based, in part, upon interviews made in 1957 at 560 households located in Atlanta, Dallas, and Denver (Harp and Dunham, 1961). His data indicate higher use frequencies for nonwhite families, larger

households, and those with higher income. However, they indicate that the average family ate rice only 2.0 times per month (appendix table C-6) compared to 5.9 for our survey. This difference is much greater than can be explained by the higher per-capita consumption prevailing in California or the upward trend that occurred. Both surveys used approximately equivalent questions, and we can offer no satisfactory justification for the discrepancy.

The 1965 Household Food Consumption Survey for the Western Region of the United States generally reported a higher proportion of households using macaroni at all income levels than found in our study (U. S. Department of Agriculture, 1965*b*).

## USE OF CONVENIENCE FOODS

American consumers have a wide choice in their food shopping. The range of selection is broadening and deepening. The average retail grocery store stocked about 900 items in 1928 and 7,500 in 1968. This increase is due to several factors: growth in the size of individual stores, handling of more nonfoods, multiplication of items by a greater number of brands, introduction of new products at a rate in excess of products discontinued, etc. Grocers consider new items important for increasing sales volume and as a competitive factor.

Many of these new items are convenience or specialty products that offer homemakers different foods or less time-consuming preparations for familiar dishes. Potatoes, rice, and macaroni are available in canned, dehydrated, frozen, instant, and flavored food forms.

Competition exists among the potato, rice, and macaroni industries and among their individual companies as they vie for consumer acceptance of their products. The amount of food that consumers eat is relatively fixed. Their purchases of starchy products is related to price, tastes and preferences, and available substitutes. The three food industries compete directly for the share of the consumer dollar that goes

for starchy foods. Furthermore, there is competition within each industry among different companies as they attempt to induce consumers to buy their products. Each company hopes that consumers will accept its new products. Each industry hopes that consumers will buy more of the items its members produce than of substitutes produced by other industries. Therefore, the companies individually as separate firms and collectively as members of an industry are interested in knowing more about why consumers try new products.

Some marketing studies have been directed toward determining the characteristics of persons who are more prone to experiment and then to accept new products that are marketed. A study made by Cornell University found that early adopters of new products usually are people who are willing to take risks, to accept change and innovation, from higher income levels, and the better educated groups. They tend to come from urban areas and to be in families where the husband is in a professional or "white collar" occupation, the wife is employed, and they have been married from four to fifteen years (Swackhammer, 1964). In another study, Lionberger (1968) mentions many of these same

factors. He also points out that late adopters tend to come from small farms, to have low incomes, to be skeptical and security minded, and to be over the age of sixty.

As changes occur in the demographic characteristics of the American population, we expect changes to occur in their food habits and dietary preference. The marketing studies pointing out characteristics of new product users also may be defining changing characteristics of the population as a whole: the geographic clustering of families in urban rather than rural settings, more married women in the labor force, the general rising level of income, the

rising educational level of the population, and the increase in young people in the population who are supposedly more receptive to new ideas and innovations.

As our population has undergone change, the foods available on the retailer's shelf have increased in variety and more conveniences have been offered to consumers. We wish to determine the changing use patterns for selected convenience foods. Hence, the respondents in this study were asked about their use of 15 food items containing potatoes, rice, and macaroni. Specifically they were asked, "Have you ever purchased any of the fol-

TABLE 7  
HAVE YOU EVER PURCHASED ANY OF THE FOLLOWING  
CONVENIENCE FOODS?

Convenience food	By location				By income level					
	Bay Area	Inland cities	Small cities	Total	Under \$3,000 I	\$3,000-\$5,499 II	\$5,500-\$6,999 III	\$7,000-\$9,999 IV	\$10,000-\$14,999 V	\$15,000 and over VI
Number of Replies	421	341	430	1,192	103	156	141	253	269	122
<i>Per cent reporting purchase*</i>										
Instant mashed potatoes...	61.1	70.4	72.8	68.0	50.5	57.1	66.7	73.3	76.9	85.8
Frozen french fries.....	67.9	62.2	69.8	66.9	36.3	57.7	63.1	74.6	80.5	76.2
Instant scalloped potatoes..	25.9	17.9	25.8	23.6	14.7	14.7	17.7	26.6	27.2	41.0
Frozen potato puffs.....	24.9	14.9	19.8	20.2	3.9	10.9	17.0	19.8	33.2	32.5
Frozen potato patties.....	20.2	13.8	19.5	18.1	6.9	14.1	16.3	16.3	24.7	30.6
Instant au gratin potatoes..	16.9	13.8	21.6	17.7	6.9	8.3	13.5	20.2	24.6	27.9
Instant rice.....	59.9	68.9	71.4	66.6	48.0	58.3	63.8	71.4	73.0	77.0
Flavored rice mixes.....	48.9	59.2	62.6	56.8	31.4	42.6	55.0	67.7	70.7	71.1
Parboiled rice.....	52.5	39.0	38.8	43.7	25.5	35.3	41.1	45.4	51.3	58.2
Frozen rice mixes.....	8.1	5.9	5.3	6.5	1.0	3.8	5.0	8.3	5.2	15.6
Packaged macaroni or noodle dinners.....	47.0	59.8	61.4	55.9	39.2	51.9	53.2	57.9	66.9	62.8
Canned macaroni or spaghetti.....	46.6	45.7	57.4	50.2	32.4	47.4	42.6	56.3	59.0	57.4
Packaged noodles almondine.....	28.5	21.1	23.5	24.6	12.9	14.1	15.0	24.3	34.9	45.9
Frozen macaroni or spaghetti dinners.....	25.2	18.2	26.3	23.6	15.7	19.2	25.5	22.2	22.5	36.9
Packaged beef stroganoff...	23.5	17.0	22.8	21.4	10.8	12.2	18.4	26.2	26.6	28.9
<i>Average per household†</i>										
Potato items.....	2.17	1.93	2.29	2.14	1.19	1.63	1.94	2.31	2.67	2.94
Rice items.....	1.69	1.73	1.78	1.74	1.06	1.40	1.65	1.93	2.00	2.22
Macaroni items.....	1.71	1.62	1.91	1.76	1.11	1.45	1.55	1.87	2.10	2.32
Total 15 items.....	5.57	5.28	5.98	5.64	3.36	4.48	5.14	6.11	6.77	7.48

\* Per cent of households reporting having purchased the item at least once before the interview date.

† Number of items (per household) purchased at least once.

NOTE: For more detail, see Appendix tables C-10 to C-13.



TABLE 8  
HOW MANY OF THESE CONVENIENCE FOODS  
HAVE YOU EVER PURCHASED?

Household characteristic	By food type*			By use frequency†			Total 15 items
	Potato items	Rice items	Macaroni items	Three used most	Four others	Eight used least	
<i>Average per household‡</i>							
<b>Location</b>							
Bay Area.....	2.17	1.69	1.71	1.89	1.95	1.73	5.57
Inland cities.....	1.93	1.73	1.62	2.01	2.04	1.23	5.28
Small cities.....	2.29	1.78	1.91	2.14	2.20	1.64	5.98
Total.....	2.14	1.74	1.76	2.01	2.07	1.56	5.64
<b>Income level</b>							
I (Under \$3,000).....	1.19	1.06	1.11	1.35	1.19	.82	3.36
II (\$3,000 to \$5,499).....	1.63	1.40	1.45	1.73	1.77	.98	4.48
III (\$5,500 to \$6,000).....	1.94	1.65	1.55	1.94	1.92	1.28	5.14
IV (\$7,000 to \$9,999).....	2.31	1.93	1.87	2.19	2.28	1.64	6.11
V (\$10,000 to \$14,999).....	2.67	2.00	2.10	2.30	2.48	1.99	6.77
VI (\$15,000 and over).....	2.94	2.22	2.32	2.39	2.50	2.59	7.48
<b>Ethnic group</b>							
Negro.....	1.24	1.30	1.29	1.28	1.62	.93	3.83
Mexican.....	1.42	.84	1.42	1.44	1.35	.89	3.68
Oriental.....	1.64	1.28	1.29	1.33	1.83	1.05	4.21
Nonwhite.....	1.42	1.14	1.32	1.40	1.57	.91	3.88
White.....	2.28	1.88	1.77	2.13	2.09	1.71	5.93
<b>Education of wife</b>							
Elementary.....	1.37	1.32	1.09	1.49	1.52	.77	3.78
High school.....	1.76	1.46	1.48	1.80	1.80	1.10	4.70
HS graduate.....	2.28	1.86	1.88	2.16	2.24	1.62	6.02
College.....	2.71	2.05	2.18	2.30	2.39	2.25	6.94
<b>Occupation</b>							
Service and labor.....	1.86	1.51	1.65	1.90	1.95	1.17	5.02
Crafts.....	2.13	1.71	1.67	2.01	2.18	1.32	5.51
Clerical.....	2.34	1.94	2.14	2.15	2.34	1.93	6.42
Professional.....	2.65	2.04	2.10	2.33	2.40	2.06	6.79
<b>Age of main earner</b>							
Under 35.....	1.99	1.55	1.75	1.88	2.10	1.31	5.29
35-44.....	2.61	1.93	2.07	2.23	2.37	2.01	6.61
45-54.....	2.27	1.94	1.92	2.03	2.27	1.83	6.13
55 and over.....	1.68	1.63	1.38	1.71	1.68	1.30	4.69
<b>Household size</b>							
1-2 persons.....	1.66	1.55	1.49	1.70	1.70	1.30	4.70
3-4 persons.....	2.39	1.92	1.90	2.22	2.17	1.82	6.21
5 or more.....	2.39	1.74	1.93	2.13	2.26	1.67	6.06

\* Potato, rice, and macaroni items, respectively, are the first six, next four, and last five convenience foods as listed in table 7.

† "Three used most" are instant mashed potatoes, frozen french fries, and instant rice. "Four others" are flavored rice mixes, parboiled rice, packaged macaroni or noodle dinners, and canned macaroni or spaghetti. "Eight used least" are the foods listed in table 7.

‡ Number of items (per household) purchased at least once.

lowing convenience foods?" Their replies are given in Appendix C and summarized in tables 7 and 8.

### Built-in conveniences

The appeal of processed and convenience foods is conditioned by numerous factors. Cost per serving may be of major importance to some families because their income is limited or they are price conscious. The saving in preparation time may be of greater concern to those with higher incomes or who do not want to spend as much time preparing meals. For still others, the introduction of greater variety into their diet is of considerable importance. Each homemaker will weigh the product's cost against the marginal utility of her food dollar, the time she saves in preparing meals by using the product, and its acceptance by the family.

Varying degrees of processing and convenience are built into the 15 products covered by this study. Some, such as flavored rice mixes, take about the same preparation time as if the product was made at home but their use offers new variations or different flavors. Others, such as packaged noodle or macaroni dinners and packaged beef stroganoff, have all of the required ingredients in premeasured quantities, are packaged in one convenient container, and save the homemaker considerable preparation time.

Generally, as more convenience is built into the product, its cost increases. For example, the instant mashed potatoes displayed at supermarkets in Davis, California, retail for about 4 cents per serving. The cost is about 9 cents for au gratin or scalloped potatoes. Flavored rice mixes cost 2 to 5 cents per serving more than instant rice while frozen rice mixes cost 6 or 7 cents more. A frozen macaroni or spaghetti dinner, which is a complete ready-to-heat meal, costs about 35 cents and saves the homemaker a considerable amount of preparation time.

Survey respondents reported substantial differences in purchase and use experiences for these convenience foods. These differences and the reasons for such variations are examined in the next few pages. Since there are more similarities than dissimilarities in purchases by different fam-

ily groups, the general patterns for all 15 convenience foods are discussed first.

### General use patterns

About two-thirds of the sample households reported having purchased at least once each of three convenience foods: frozen french fries, instant mashed potatoes, and instant rice. Four others had been purchased almost as frequently (each by 44 to 57 per cent of the families): flavored rice mixes, parboiled rice, packaged macaroni or noodle dinners, and canned macaroni or spaghetti. Only 6 per cent of the respondents had ever purchased frozen rice mixes. The other seven convenience foods were tried by 18 to 25 per cent of the households. In other words, most families have not yet tried the newer products. Among the reasons for this situation is that they are not as readily available, are relatively unknown, and are not within the eating experience patterns of the respondents even as home-prepared dishes.

Changes in the percentages of families that had tried using these convenience foods were associated with variations in family income, education, and other factors. A strong positive correlation existed between income and the proportion of households reporting purchases for each of the fifteen items—see table 7. Families with incomes under \$3,000 had purchased 22.4 per cent of the 15 foods (3.36 items). This proportion increased with successively higher income levels to 50 per cent (7.48 items) for families in the \$15,000 and over income bracket. Approximately the same regressional relation existed for potato items, rice items, and macaroni items.

However, there were substantial variations among individual items. These seemed to be related to purchase frequency. For the three items tried most often (by two-thirds of the households) the percentage of families having made purchases rose from 45 at the lowest income level to 80 at the highest level. The corresponding increase was from 30 to 62 per cent for the four foods in the second group, and from 10 to 32 per cent for the eight items tried infrequently. Thus, the relative frequency of use with higher income tends to be greater for newer products,

i.e., for those that have been tried less often by all households.

Table 8 indicated the average number of items purchased per household classified by various household characteristics. Data are given for potatoes, rice, macaroni, and all 15 items. They are also given for the three groups classified by use frequency. Hence, it will be possible to compare variations for products used less often with those for products used frequently.

Purchase frequency is correlated positively with the wife's education as it is with income. The proportion of families making purchases increased from 25 per cent (3.78 of the 15 items) if the wife's education ended with elementary school to 46 per cent (6.94 items) if she attended college. It was much lower for families from craft and service occupations than those in professional and clerical occupations. Nonwhite families tried these items only two-thirds as often as did white families. Small families (one or two persons) had tried 4.7 of the 15 items compared to 6.1 for larger families. Interestingly, medium-sized families (three or four persons) had purchased about the same number of items as had large families (five or more persons). A definite curvilinear correlation prevailed when age (of main earner) was used as the independent variable. Families in the 35-54 age group purchased 6.4 items compared to 5.3 and 4.7, respectively, for younger or older families.

Variations in purchase frequency were much greater for the eight least-used items (table 8, penultimate column) than for the others regardless of which factor is used as the independent variable. For example, wives who had attended college had purchased the least-used items three times as often as had those with only an elementary education compared to 1.5 times as often for the most-used products. Similarly, professional families tried the least-used and most-used items 1.8 and 1.2 times as often, respectively, as had families in service and labor occupations.

The eight newer products were tried 25 per cent less often in the inland cities than in the other two survey segments. Also the seven "older" items were purchased somewhat less frequently (10 per cent) in the

Bay Area. However, on the whole, these locational variations were not highly significant statistically. Differences by employment status of the wife were even smaller; in fact, they were negligible.

In brief, the 15 convenience foods, especially those introduced most recently, were tried more often by California households in the higher socioeconomic groups—as measured by family income, wife's education, husband's occupation, and the family's ethnic background. The proportion of users was lower among small families and for households where the main wage earner was under 35 or over 55 years of age.

Thus, these findings generally support the results reported in other studies as to the basic characteristics of new product users. They also support Bennett's thesis (1941) that basic potato and cereal foods are replaced by substitutes in the economically more developed countries. The substitution is occurring here by households using more of the items which embody greater convenience in the form of a flavor variety feature or a timesaving factor because the item is premeasured or semi-prepared. Reference was made early in this report to the definite tendency of Americans to replace fresh potatoes by processed potatoes in their diet and to use rice and macaroni specialty products in greater volume.

## Processed potato products

The sharp increase in the processing of potatoes that occurred during the past decade or two and is still occurring does not mean that processed potato products are being substituted extensively for fresh potatoes in all households and in all cooking preparations. Actually, many people do not use processed potatoes except occasionally while others use them for some purposes and not others. Survey respondents were asked, "Which potato product do you buy when you want to serve potatoes in each of the following (eight) forms?" Their replies, summarized in table 9, indicated a decided preference for using fresh potatoes for each preparation except french frying.

Almost all families serve potatoes in each of four ways. Fresh potatoes are pre-

TABLE 9

WHICH POTATO PRODUCT DO YOU BUY WHEN YOU WANT TO SERVE  
POTATOES IN EACH OF THE FOLLOWING FORMS?

Item	Baked	Boiled	Potato salad	Mashed	Scalloped	Au gratin	Patties	French fries
<i>Number of replies</i>								
Product purchased								
Fresh.....	1,124	1,088	1,035	880	771	584	659	543
Dehydrated.....	2	7	2	228	92	103	25	2
Frozen.....	5	3	5	8	9	13	89	393
Other.....	7	18	19	27	11	17	15	26
Total who serve*	1,138	1,116	1,061	1,143	883	717	788	964
Don't serve.....	48	73	123	40	300	465	396	220
Total replies.....	1,186	1,189	1,184	1,183	1,183	1,182	1,184	1,184
<i>Per cent who serve†</i>								
Bay Area.....	96.9	93.3	88.0	94.5	73.2	61.5	64.8	80.4
Inland cities.....	93.5	91.8	89.1	98.2	71.3	55.2	62.2	82.0
Small cities.....	99.7	96.0	91.4	97.4	78.7	64.2	71.7	82.0
Total.....	96.0	93.9	89.6	96.6	74.6	60.7	66.7	81.4
<i>Per cent who buy fresh potatoes‡</i>								
Bay Area.....	97.8	96.7	96.4	80.3	86.6	81.3	80.8	53.0
Inland cities.....	99.1	97.1	97.3	73.5	88.0	82.8	87.7	62.2
Small cities.....	99.5	98.5	99.0	76.7	87.5	80.7	83.3	54.9
Total.....	98.8	97.5	97.5	77.0	87.3	81.5	83.6	56.3

\* Number of sample households that buy any potato product for the indicated cooking preparation.

† Number who serve the indicated cooking preparation divided by number of replies.

‡ The percentages are derived from the replies given in the top portion of the table in the case of the "total" sample. They are derived similarly for the three locational segments from the same type of data which, however, are not given in this table.

§ Number who buy fresh potatoes to make the indicated cooking preparation.

ferred by 98 per cent of the homemakers for baking, boiling, and potato salad, and by 77 per cent of them for mashed potatoes. Scalloped, au gratin, and pattie potatoes are served in two-thirds of the homes. Most of them buy fresh potatoes. However, 13 to 18 per cent prefer processed potatoes, usually frozen potato patties and the dehydrated product for scalloped and au gratin potatoes. French fries are viewed differently. Fresh potatoes are preferred in only 56 per cent of the households serving french fries.

Thus, California homemakers have a strong preference for fresh potatoes when they include potatoes in their meals. Frozen potatoes are used extensively for french fries and, to a much lesser extent, for potato patties. Dehydrated potatoes are purchased by 20, 14, and 10 per cent, respectively, by the families when they serve mashed, au gratin, and scalloped potatoes.

There are locational differences among the survey families with respect to the percentage of those who serve potatoes in each of the eight ways and of those preferring fresh over processed potatoes for each cooking preparation. These variations are not large. There does seem to be a slight tendency, however, for potatoes to be served in each of the eight ways somewhat more often by families in small cities than by those living in inland cities and the Bay Area. Users of fresh potatoes are more frequent in small cities when potatoes are wanted for baking, boiling, and salad; in the Bay Area, when they are to be mashed; and in inland cities, for the four other uses.

A consideration of the characteristics of users of processed potatoes may give a clue about the opportunities for expanding sales among nonusers. In the main, these follow the general patterns already



discussed. Some details and contrasts, however, need to be mentioned (based on data represented in tables 7 and 8, and Appendix tables C-10 to C-13).

Two items (instant mashed potatoes and frozen french fries) were purchased at least once by 67 per cent of the sample households and the other four by 20 per cent, on the average. For convenience, these two groups are referred to as the older and newer processed potato items in this discussion of user characteristics.

The proportion of users was positively correlated with income, wife's education, and husband's occupation. Over the income and educational scales used for this study, users increased from 50 to 80 per cent of the families for the two older products and from 10 to 30 per cent for the newer items. The proportion rose from 66 to 79 per cent for the older items and from 14 to 28 per cent for the newer ones in going from service and labor to professional occupations.

In conformity with the general patterns already described, the proportion of users was higher among white families, larger families, and those where the wage earner was middle-aged. White families had tried processed potatoes more often than had nonwhites—70 compared to 49 per cent for the older products and 22 compared to 11 per cent for the newer items. Users represented 75 per cent of larger families and 53 per cent of small families for the older products compared to 22 and 15 per cent for the new items. The older items were tried by 77 per cent of the families aged 35-44 and by 53 per cent of those 55 and older. For the newer products, the percentages were 27 and 15 for families in the two age groups.

There were, of course, differences among the individual processed potato products. For example, the difference in the proportion of users among white and nonwhite families was about the same for frozen french fries as for instant mashed potatoes. The percentage of users varied much more for frozen french fries, however, when families were grouped by each of the other characteristics: income, education, occupation, age, and size (see Appendix table C-10).

## Convenience rice products

Only 77 (6.5 per cent) of the sample households had ever purchased frozen rice mixes. Since the number of users is so small, meaningful comparisons are difficult to make and this item is omitted from the discussion. The limited data gathered, however, does strongly suggest that user characteristics for frozen rice mixes are similar to those for the other three rice products.

Two-thirds of the households had tried instant rice compared to 57 and 44 per cent for flavored rice mixes and parboiled rice. Our comparison of user characteristics is largely in terms of contrasting instant rice with the other two rice products.

Locational differences were negligible between inland cities and small cities. However, families living in the Bay Area had tried each rice product in substantially different proportions. More had purchased parboiled rice at least once (53 versus 39 per cent), while fewer had used the other two items—60 versus 70 per cent for instant rice and 49 versus 61 per cent for flavored rice.

The positive correlation of the percentage of users to income and education was fairly similar for the three items, especially with respect to the increase over the range of income and education used. However, some differences might be mentioned. Most of the increase in the proportion of users of instant rice and flavored rice occurred over the income range from under \$3,000 to \$7,000-\$9,999, whereas the proportion continued upward for parboiled rice. Users of the three products increased in much the same way over the educational scale, except that the proportion was relatively low for instant rice bought by wives who continued their education into high school but did not graduate.

Noticeable differences showed up among users when classified occupationally. For parboiled rice, percentages of users were 33 in service and labor occupations, 42 in the crafts occupation, and 52 among both clerical and professional families. In contrast, about 57 per cent of the families from the first three groups (service-labor, crafts, and clerical) had purchased flavored rice compared to 69 per cent among pro-

fessional families. Instant rice was in an intermediate position. The percentage of users rose more or less steadily through the occupational groups from 58 among service and labor families to 76 for professional families.

All three rice products had been purchased more frequently by white than nonwhite families: 73 versus 42 per cent for instant rice; 62 versus 36 per cent for flavored rice; and 46 versus 32 per cent for parboiled rice. Some significant differences existed among minority ethnic households. Users of the three products were almost identical among Negroes and Orientals—the proportion ranged from about 39 to 43 per cent for both groups. Mexican-Americans had tried instant rice to the same extent but only 25 and 17 per cent had ever purchased flavored rice and parboiled rice.

In conformity with the general patterns for all the convenience food studied, the proportion of users of the three rice products varied in a curvilinear fashion with age and size of the household. For each product, users were about equally frequent among families in the 35-44 and 45-55 age brackets. Substantially fewer younger and older families were users. These products had been tried more often by households with 3-4 persons than by larger or smaller families (see table 10).

### Convenience macaroni products

For convenience, the five macaroni products are put into two groups according

to use frequency by the sample households. About half of the families have tried packaged macaroni or noodle dinners (56 per cent) and canned macaroni or spaghetti (50 per cent). Only one-quarter have purchased the other three: frozen macaroni or spaghetti dinners (25 per cent), packaged noodles almonidine (24 per cent), and packaged beef stroganoff (21 per cent). The discussion is oriented mainly to comparing user characteristics for these two product groups, the older and newer macaroni products, respectively. Although there are, of course, differences among the individual items, the similarities are stressed.

Locational differences prevailed but the pattern was not clear cut. Generally, one-quarter fewer families in one part of the survey had purchased a given item than was the case elsewhere. Users were less frequent (by this proportion) in the Bay Area for packaged macaroni or noodle dinners, in the Bay Area and inland cities for canned macaroni or spaghetti, and in inland cities for the three newer products.

There were no sharp differences between older and newer products with respect to user characteristics associated with income, education, or occupation. Over the income range (from under \$3,000, to \$15,000, and over), the proportion of users increased from 36 to 60 per cent of the families for the two older products, and from 13 to 37 per cent for the three newer ones. The number of users increased to the same extent in going from families with only an elementary education to those with some college—from 40 to 59 and from 10 to 33 per cent, respectively, for the two product groups. Occupational differences were small between families of service and labor workers and craftsmen on the one hand or between those of clerical and professional classes on the other. For all five products, variations in users were confined mainly to differences between "blue collar" and "white collar" classes. For the older products, the percentages of users were 54 and 61 for the two groups of families, respectively, compared to 20 and 30 for the newer products.

User frequency was correlated by a curvilinear relationship to age of the main

TABLE 10  
PERCENTAGES OF USERS FOR  
CONVENIENCE RICE PRODUCTS

Characteristic	Instant rice	Flavored rice	Par-boiled rice	Average
<i>Age of main earner</i>				
Under 35.....	51.8	57.2	41.5	50.2
35-44.....	68.9	63.5	51.5	61.3
45-54.....	71.4	63.2	51.5	62.0
55 and over.....	63.9	45.3	39.6	49.6
<i>Size of household</i>				
1-2 persons.....	63.3	47.7	36.9	49.3
3-4 persons.....	72.0	64.1	49.1	61.7
5 or more.....	64.6	59.0	45.0	56.2

earner. Families in the 35-44 age group used the five products most frequently, followed in order by families in the 45-54 age group, those under 35, and, finally, the oldest group (55 and over). The older products were purchased by 61 per cent of the families in the 35-44 bracket and newer products by 28 per cent. The proportion of users decreased to 42 and 18 per cent, respectively, for the two product groups for families where the main earner was 55 years or older.

These products had been tried less frequently by small families (1-2 persons) than by others. For the two older products, users represented 43 per cent of the small families compared to percentages of 57 for 3-4 person families and 61 for larger ones. The user pattern was less clear for the newer products. But, on the average for the three items, the percentages were 21, 25, and 24, respectively, for small, medium, and large families.

## APPENDIX A: DEFINITION OF TERMS

Meanings of several demographic factors were modified somewhat for this consumer survey. The precise definitions adopted are listed below together with such supplemental comments as appear appropriate.

**Household unit:** A person living alone or a group of persons living together (in a house, an apartment or other group of rooms, or a single room which constitutes a housing unit) who pool their incomes and draw from a common fund for their major expenses. This is a modification of the BLS definition of a family or consumer unit. Thus, the sample includes one-person households and those with a widow, widower, or a divorced person, but excludes a group of students or others living together in a boarding house or cooperative.

**Income level:** The respondent was asked to indicate the yearly income of his household by identifying one of six income categories listed on a card:

Income level I:	under \$3,000
Income level II:	\$3,000-\$5,499
Income level III:	\$5,500-\$6,999
Income level IV:	\$7,000-\$9,999
Income level V:	\$10,000-\$14,999
Income level VI:	\$15,000 and over

**Ethnic group:** After completing the interview, the enumerator classified the household ethnically without asking the respondent to identify the family's ethnic background. Hence, the classification represents the enumerator's opinion about

the respondent (and other persons of the household that may have been seen). Since only three households were classed as Indian, these were included with Mexican-Americans and only four ethnic groups are used:

1. Negro
2. Oriental
3. Mexican—Mexicans-Americans and Indians
4. White—caucasians except Mexican-Americans

**Educational level:** The respondent was asked to state the last grade of school completed by the husband and by the wife. For most purposes four educational levels are used:

1. Elementary—completed 1-8 years of school.
2. High school—completed 9-11 years of school.
3. High school graduate—completed 12 years of school.
4. College—completed one or more years at any collegiate institution of higher learning. Study or training at a business or technical school was not counted toward attendance at college.

**Occupational class:** The respondent's description of the occupation of the husband (or main income earner if there was no husband in the household) provided the basis for putting the household in one of the occupational categories defined by the U. S. Bureau of the Census (*1960 Census of Population, Classified Index of Occu-*



*pations and Industries*). Six occupational classes are established:

1. Professional — professional, technical and kindred workers, officials, plus farm and nonfarm managers and proprietors.
2. Clerical—clerical, sales, and kindred workers.
3. Crafts—craftsmen, foremen, kindred skilled workers, and semiskilled operatives.
4. Service and labor—service workers, private household workers, and laborers (including those on farms and in mines).
5. Retired—retired workers.
6. Other — military personnel, homemakers, students, and unemployed persons.

**Employment of wife:** The wife in the household (if any) is classified as

1. Employed, if she was part of the labor

force, working either full time or part time for pay.

2. Homemaker, if she was not employed regularly outside the home.

**Household size:** Replies to "How many persons are there currently living in your household?" identify three family-size groups:

1. 1-2 persons
2. 3-4 persons
3. 5 or more persons

**Age of main earner:** Replies to "What is the age of the main earner?" specify four age groups for the sample families:

1. Under 35 years
2. 35-44 years
3. 45-54 years
4. 55 years or more

**Note:** See Appendix table B-1 for list of survey cities and Appendix table C-10 (or text table 7) for an enumeration of the 15 convenience foods covered by the survey.

## APPENDIX B: THE CONSUMER SURVEY<sup>9</sup>

It was expected that the information secured by this survey of households in Northern California would be affected by variations in demographic factors such as ethnic classification, level of income, occupation of the main earner, education of the husband and wife, size of family, etc. It was assumed, furthermore, that some consumer activities, preferences and attitudes might vary substantially from community to community. Hence, it was decided to make interviews in households of varying socioeconomic classes in several cities of different population size rather than conducting a more intensive study in only a few metropolitan markets.

### Sample design

A modified two-stage area sampling method was adopted. The first stage consisted of the selection of the cities surveyed; the second of the selection of households to be interviewed within each city.

Figure 1 shows the geographical distribution of these survey cities. The number of the sample households and their location are listed in table B-1.

**Sample cities.** The survey was limited to the portion of California north of the Tehachapi Mountains. However, households located in 25 northern counties (including all of those along the eastern border of the State) were excluded as were those in rural areas and in population centers with less than 2,800 inhabitants. Thus, interviews were made in the nonrural area north of the Tehachapi Mountains and west of the Sierra Nevada foothills. This survey region is referred to as Northern California in our study.

Three different urbanization segments were chosen. *Bay Area* includes the cities in the urbanized territory of the five Bay Area counties, centered around three population-concentration areas: San Fran-

<sup>9</sup> The same survey was used to obtain a better understanding of consumers' attitudes toward, and the use of, credit cards. Results of this part of the inquiry are reported in DeLoach and O'Rourke, 1969.



cisco (plus nearby Daly City and Bayshore), East Bay (consisting of Richmond, San Pablo, El Cerrito, Albany, Berkeley, Emeryville, Piedmont, Oakland, Alameda, and San Leandro), and the San Jose region (comprised of San Jose, Santa Clara,

Campbell, Sunnyvale, and Mountain View, plus adjoining urbanized areas). Other urbanized areas are represented by the four *inland cities* of Sacramento, Stockton, Fresno, and Bakersfield, plus surrounding populated environments. *Small*

TABLE B-1  
THE SAMPLE: NUMBER AND LOCATION OF SAMPLE HOUSEHOLDS;  
POPULATION IN SAMPLE AREA

Sample city*	1960 Population		1960 Households (1,000)	Sample size†		
	1,000 Persons	Per cent of 1950		Drawn	Used	Ratio‡
<i>Bay Area</i>						
San Francisco.....	740.3	95	292.0	200	144	49
East Bay.....	754.3	100	257.8	200	99	38
San Jose.....	358.8	291	105.1	200	178	169
Total Bay Area.....	1,853.4	112	654.9	600	421	64
<i>Inland Cities</i>						
Sacramento.....	191.7	139	66.6	160	133	200
Stockton.....	86.3	122	27.7	70	54	195
Fresno.....	133.9	146	42.5	100	100	236
Bakersfield.....	56.8	163	18.1	70	54	299
Total Inland Cities.....	468.7	140	154.9	400	341	220
<i>Small Cities</i>						
Arcata.....	5.2	140	1.5	8	9	..
Eureka.....	28.1	122	9.5	24	24	..
Cloverdale.....	2.8	220	.9	6	6	..
Healdsburg.....	4.8	148	1.7	6	6	..
Santa Rosa.....	31.0	173	10.9	28	28	..
Petaluma.....	14.0	136	4.7	16	9	..
Napa.....	22.2	163	7.3	20	20	..
Paso Robles.....	6.7	138	2.2	8	9	..
Atascadero.....	6.0	174	1.6	8	10	..
San Luis Obispo.....	20.4	144	6.9	14	14	..
Coastal.....	141.2	148	47.2	138	135	286
Yreka.....	4.8	147	1.6	8	10	..
Weed.....	3.2	118	1.1	6	6	..
Dunsmuir.....	2.9	127	1.0	6	6	..
Redding.....	12.8	126	4.4	16	14	..
Anderson.....	4.5	‡	1.3	8	6	..
Red Bluff.....	7.2	147	2.3	8	8	..
Corning.....	3.0	118	1.1	6	6	..
Willows.....	4.1	137	1.3	6	6	..
Chico.....	14.8	120	4.9	16	17	..
Pradise.....	8.3	‡	3.3	8	8	..
Oroville.....	6.1	114	2.2	6	6	..
Upper Interior.....	71.7	154	24.5	94	93	380
Yuba City.....	11.5	146	3.7	18	15	..
Marysville.....	9.6	122	3.2	14	14	..
Olivehurst.....	4.8	135	1.4	6	6	..
Woodland.....	13.5	144	4.3	18	12	..
Davis.....	8.9	251	2.6	18	17	..
Yacaville.....	10.9	344	3.1	18	18	..
Fairfield.....	15.0	480	4.1	18	17	..
Middle Interior.....	74.2	192	22.4	110	99	411

Sample city*	1960 Population		1960 Households (1,000)	Sample size†		
	1,000 Persons	Per cent of 1950		Drawn	Used	Ratio‡
Manteca.....	8.2	217	2.5	10	6	..
Tracy.....	11.3	134	3.5	14	14	..
Modesto.....	36.6	210	12.3	30	25	..
Ceres.....	4.4	188	1.3	6	5	..
Turlock.....	9.1	146	3.1	18	16	..
Madera.....	14.4	138	4.3	12	12	..
Hanford.....	10.1	101	3.2	10	10	..
Delano.....	11.9	137	3.3	12	9	..
Wasco.....	6.8	122	1.9	6	6	..
Lower Interior.....	112.8	155	35.4	118	103	291
Total Small Cities.....	399.9	158	129.5	460	430	332
GRAND TOTAL.....	2,722.0	121	939.3	1,460	1,192	127

\* Nearby urbanized territory is included in the Bay Area and in the inland cities.

† Sample size is described by three figures which have the following meanings:

Drawn—The number of households specified by the sample design.

Used—The number of completed questionnaires obtained.

Ratio—The number of completed questionnaires per 100,000 households (as of 1960).

In five small cities (Yreka, Chico, Arcata, Paso Robles, and Atascadero), extra interviews were made in connection with the training program and hence for these cities the number used exceeds the number specified.

‡ Population data reported separately only since 1950 by geographical area indicated.

SOURCE: U. S. Bureau of the Census [1960] plus data on this survey.

*cities* denotes the 37 other survey cities intended to represent the remaining area. They were selected by a cluster sampling of city groups.<sup>10</sup> For example, the North Coast includes two cities: Eureka with 28,000 people (in 1960) and Arcata with 5,200. These 37 small cities had a 1960 population of 393,900. The five largest ranged from 37,000 to 20,000, eleven had 15,000 to 9,000, and the other 21 varied from 9,600 to 2,800.<sup>11</sup>

**Sample households.** A set of dwellings was drawn randomly for each survey city. The first step in this selection consisted of specifying the sample street and block.

A street map of the city was marked off with equally spaced parallel, vertical, and horizontal rulings giving about ten times as many intersection points as the number of dwellings to be selected. These grid points were numbered in sequence (from the upper left-half to lower right-hand corner and the required number was drawn at random. Each such selected grid point gave the approximate location of a sample street. Its exact location was determined by taking the street lying nearest the grid point. The portion included between the two intersecting streets (or other "natural" boundary, such as railroad,

<sup>10</sup> Cluster sampling is a procedure for dividing the universe into several groups or clusters and then drawing a number of these clusters for the sample. The clusters in our case were groups of cities along (or near) preselected segments of principal highway routes. This method was used in preference to a random sample because it was assumed that the cost savings realized from the reduction in travel time for interviews more than offset the additional cost involved in using a larger sample which is needed for getting results of equal precision.

<sup>11</sup> Sample households were randomized within each urbanization segment but were not distributed proportionately among the three segments. Presumably the sample information gives unbiased estimates of parameter values for the segments considered separately. Values for the entire region surveyed can be estimated better by using household numbers (or some other factor) as weights for combining sample values for the three segments than by merely "blowing up" the sample information. This refinement was not introduced even though the sampling ratio was less (maybe by one-third) in the Bay Area than elsewhere. Its omission is serious only in those cases in which the parameter estimate is much different for the Bay Area than for the other two segments.

tracks, river, end of street, etc.) lying on either side of the grid point specified the sample block of this sample street.

The second step designated the sample dwelling for the sample street and block. A number from 1 to 10 followed by the letter E or U was assigned randomly to each sample street and block. The letter denoted the side of the street to be used, with "E" representing an even numbered address and "U" referring to an uneven (i.e., odd) numbered address. The digit denoted the dwelling count on that side of the street going from lowest to highest numbers for the block. Thus, 3E referred to the third even number, 1U to the first uneven (odd) address, etc.<sup>12</sup>

Finally, a location sheet was prepared to identify the sample dwellings for each city. Column 1 gave the grid point on the marked street map. Column 2 designated the sample dwelling (e.g., 3E). Columns 3 and 4 identified the street and particular block for this sample dwelling. These dwellings were listed (separately for each city) numerically by grid number rather than in the order randomly drawn.

It was estimated that about 10 per cent of the households contacted would not result in completed questionnaires even after substitutes were made because an adult was not home or refused to cooperate or the sample block drawn had no residences. This was a mere guess. It proved to be very ample.

The number of sample dwellings to be selected from the various cities was not in proportion to the number of households. Relatively more dwellings were chosen for the sample from smaller cities. The sample had 92 dwellings per 100,000 households (in 1960) for the Bay Area, 258 for the four large inland cities, 261 for the eleven larger

small cities, and 444 for the twenty-six small cities with fewer than 4,000 households in 1960.

Dwellings were drawn in pairs rather than individually as is often done. For each sample dwelling, a nearly paired household (selected in a definite manner) was included for a second interview. It was estimated that 50 per cent more interviews could be completed per day by the pairing method because of the considerable reduction in travel time. Each sample dwelling was assigned an uneven questionnaire number and its paired dwelling the next integer so that statistical tests could be made to determine whether this pairing method was more efficient. This determination has not yet been made.

**Evaluation.** No "callbacks" were made to contact housewives not home at the time of the initial call. Instead interviewers contacted a substitute dwelling. No evening or weekend interviews were attempted in an endeavor to include more working wives. Presumably this procedure resulted in an undersampling of households with housewives away from home a relatively large part of the day because of work or for other reasons.

Since sample streets and blocks were drawn on an area basis, dwellings on larger lots had a higher probability of being selected. This means a bias toward lesser inclusion of families living in congested areas—i.e., generally, those with less education, lower income, etc.

The selection of small cities was guided in considerable part by the geographic distribution of available enumerators. However, there is no reason for assuming that the information gathered from the cities used is different to any material

<sup>12</sup> Procedures were developed for handling exceptions that might and did arise. Here are a few examples. If the designation was 41st Street between J and K Streets whereas, in reality, K Street did not intersect 41st Street, the interviewer was instructed to use the block between J and L. If the sample dwelling did not yield a completed questionnaire because occupants were not at home or refused to cooperate, the interviewer selected a substitute dwelling in a prescribed manner. Procedures were also specified for handling other exceptional situations: the selected block had no residences, all residences were on one side of the street, more than one family lived in a single dwelling, the address located a multiple dwelling, the number sequence for the dwelling exceeded the number of dwellings on that side of the street, the street had irregular intersections, etc. For unspecified exceptions, interviewers were asked to make a common sense adjustment and proceed since it was felt that giving rigid rules to cover all possible cases was unnecessary since a few small deviations probably would not be of statistical consequence.

extent from what would have been obtained for a sample taken more randomly.

## Data collection and analysis

The questionnaire was constructed about three months before the survey began. It was checked by various personnel at the University of California to determine what changes, if any, were needed in the order of questions or in their wording. A pilot study was conducted in Davis and Sacramento mainly to obtain an estimate of the time required for completing an interview. The allocation allowed seemed ample. (A copy of the questionnaire is at the end of this appendix.)

The interviews were made in October and early November, 1968. To achieve greater consistency in the interviewing process, a training session was held in September for those who were to supervise the field enumeration. It was devoted to explaining the objectives and design of the survey and the method to be used by enumerators for locating sample dwellings and for filling out questionnaires. The three-hour meeting also seemed to allow ample time for answering questions raised by those in attendance.

Each field interviewer received a location sheet listing the dwellings to be contacted and a marked city map to be used for planning an orderly and efficient route to be followed in making interviews. She was cautioned to contact all assigned sample and paired dwellings (or their substitutes) since omissions in one section of the city might introduce a systematic statistical bias. She was instructed to enter questionnaire numbers in the prescribed manner so that paired dwellings could be identified.

The only check on the work of the interviewers was that done by field supervisors. A few minor discrepancies were discovered and corrected. Editing was limited to reviewing the questionnaires to remove inconsistencies and to coding the information for punch cards. One card was partly mispunched as to occupation and, hence, this observation is omitted from some tabulations.

The chi-square test was used to deter-

mine whether the observed differences in results associated with variations in demographic factors were due to random sampling fluctuations. Generally, the probability level of 0.05 was used as the boundary between significance and nonsignificance. It was not necessary, however, to apply the test in many cases since mere examination of the differences indicated that they were or were not sufficiently large to be statistically significant.

## The sample drawn

Table B-2 (see note on page 37) classifies respondents by household characteristics. This information indicates that several factors are highly intercorrelated. For example, a great deal of assortative mating by education existed. This means that women tended to have a husband whose education ended with about the same grade as their own. Thus, of the women who completed eight or less years of schooling, 68 per cent were married to men with the same limited education, while 81 per cent of those who went to college had husbands with some college education. Similarly, income was affected by various demographic characteristics. To illustrate, 57 per cent of the Negro and Mexican families had incomes under \$5,500 and 6.5 per cent over \$10,000 compared to 20 and 43 per cent, respectively, for white families.

Table B-2 also reveals that nonresponses did not present a serious problem. Their number was quite small for some factors. For example, only 15 households (1.3 per cent of the 1,192 in the sample) were not classified by the number of persons currently living in the household. The figure was 3.3 per cent by ethnic group, about 4 per cent by occupation and the husband's education, and 9 to 12 per cent by the wife's education, income level, and age of the main income earner.

More nonresponses were given in the two-way classifications. Generally, they were distributed randomly. In a few cases, however, a definite bias was indicated. For example, if the data are sorted by the wife's and husband's education, the proportion of nonresponses decreases steadily from elementary to college.<sup>13</sup>

<sup>13</sup> Nonresponses are significantly different proportions at even the 0.005 probability level for three of the cross-classifications in table B-2: wife's education  $\times$  husband's education, wife's



We assumed the sample would be large enough to give results which would be good approximations for the true facts describing the universe, whatever those may be. To judge whether this was the case, the standard error was computed for several means.<sup>14</sup> These computations suggest that the sample size was adequate for giving reasonably reliable estimates of true means, particularly where the data were not distributed among an excessive number of cross-classifications.

Potatoes were eaten 13.33 times per month (on the average), by the 1,192 sample households. The computed standard

error was 0.283 or 2.12 per cent of the derived mean. This means that for a sample of this size, the chances are 2 out of 3 that the true mean lies within 2.12 per cent of the observed mean and 19 out of 20 that it is within 4.24 per cent (i.e., two standard errors). The standard errors were 3.21 and 2.68 per cent of the sample means (5.90 and 4.34 times per month) for rice and macaroni products.<sup>15</sup> Sample results had about the same reliability for purchases of seven convenience foods (Appendix table C-10) and were half as reliable for the other eight.<sup>16</sup>

### *Copy of Questionnaire*<sup>17</sup>

HOUSEHOLD SURVEY—NORTHERN CALIFORNIA, 1968

Selected Consumer Shopping and Credit Patterns

..... Questionnaire Number

*We are interested in learning about consumer shopping practices and use of certain foods. May we ask you a few questions?*

*PART I: We would like to ask you about your use of some specific foods—potatoes, rice, and macaroni products.*

---

education  $\times$  occupation, and income  $\times$  occupation. They are significant at approximately the 0.05 level for wife's education  $\times$  ethnic group and income  $\times$  wife's education. In all other cases, the computed value of chi-square is smaller than the tabulated value at the 0.10 level. In brief, variations in the number of nonresponses arise primarily from sampling fluctuations.

<sup>14</sup> The standard error measures the precision of the sample mean by specifying the extent to which averages for new samples (of the same size) would be likely to vary solely because of chance fluctuations in sampling at random from the same universe. About 68 per cent of the sample means will lie within one standard error of the true mean, 95 per cent within two standard errors, etc. The standard error of the mean is computed as the standard deviation of the sample items divided by the square root of the sample size used for deriving the mean.

<sup>15</sup> If sample means are computed separately for the three geographic areas, the standard errors are larger (by about 70 per cent), as is to be expected. Averages of the three standard errors (each expressed relative to the relevant sample mean) are 3.54, 5.41, and 4.63 per cent, respectively, for potatoes, rice, and macaroni products. Even for rice (the least reliable case), averages by areas lie within 10.8 per cent (twice 5.41) of the true means with 95 per cent confidence.

<sup>16</sup> In computing average purchases (and standard errors) for these 15 convenience foods, weights of 0, 1, and 2 were used for the three answers (have not purchased, have purchased once, and have purchased more than once). On this basis, the standard errors (expressed as percentages of the sample means) were about 2.2 per cent for three foods (french fries, instant mashed potatoes, and instant rice), 3.0 per cent for four more (flavored rice, parboiled rice, canned macaroni or spaghetti, and packaged macaroni or noodle dinners), 5.9 per cent for seven others, and 11.6 per cent for frozen rice. It should be indicated that the weights used here were selected arbitrarily. However, another set (within reason), would give essentially the same comparisons. For example, using weights of 0, 1, and 3 increases the standard errors only slightly.

1. How often do you eat potatoes at home?

- |                         |                  |                 |
|-------------------------|------------------|-----------------|
| 1. More than once a day | 4. Twice a week  | 7. Once a month |
| 2. Every day            | 5. Once a week   | 8. Seldom       |
| 3. Every other day      | 6. Twice a month | 9. Never        |

2. When you have potatoes at home what *one* form do you serve *most* frequently?

- |           |                 |  |
|-----------|-----------------|--|
| 1. Mashed | 4. French fried | 7. Mashed, boiled, baked as frequently |
| 2. Boiled | 5. Potato chips | 8. Mashed, baked as frequently         |
| 3. Baked  | 6. Au gratin    | 9. Other.....                          |

3. Which *one* of these factors matters most to you in selecting fresh potatoes?

- |   |                                      |
|---|--------------------------------------|
| 1. Price                                | 5. The size of the package           |
| 2. Cleanliness of potatoes              | 6. The way you will use the potatoes |
| 3. Freedom of the potatoes from defects | 7. None of these                     |
| 4. Whether they are packaged or not     | 8. Other.....                        |

4. If you want to serve the potatoes in each of the following forms, which type of fresh potato would you select?

Form	White round	White long	Russet	Red	Doesn't matter	Don't know	Don't serve in this form
Boiled							
Mashed							
Baked							
French fried							
Potato salad							

5. If you want to serve potatoes in each of the following forms, which type of potato product would you buy?

Form	Fresh	Frozen	Instant or dehydrated	Canned	Don't serve in this form	Other
Boiled						
Mashed						
Baked						
French fried						
Au gratin						
Scalloped						
Patties						
Potato salad						

<sup>17</sup> This version differs somewhat from the questionnaire actually used. It omits questions on PART II (the section dealing with the distribution and use of customers' credit cards) and various rulings which were added to facilitate editing the questionnaires and preparing answers for punch cards. Also, the material is given in a more condensed form to permit presenting it on fewer pages.

6. Do you use fresh potatoes more often than potatoes in a convenience form?

1. Yes..... 2. No.....

7. Do you think plain potatoes are fattening?

1. Very fattening                      3. Not fattening                      5. Don't know  
2. Moderately fattening              4. No opinion                          6. Other

8. As a change from potatoes which of the following would you serve first?

1. Rice                                      3. Macaroni or spaghetti              5. Nothing  
2. Noodles                                4. A salad or vegetable                6. Other

9. How often do you eat rice at home?

1. More than once a day                4. Twice a week                          7. Once a month  
2. Every day                                5. Once a week                          8. Seldom  
3. Every other day                        6. Twice a month                        9. Never

10. When you buy rice is it usually

1. Plain regular rice                      4. Brown rice  
2. Parboiled or converted rice        5. Flavored rice mixes  
3. Minute or instant rice                6. Other

11. How often do you eat macaroni, spaghetti or noodle products at home?

1. More than once a day                4. Twice a week                          7. Once a month  
2. Every day                                5. Once a week                          8. Seldom  
3. Every other day                        6. Twice a month                        9. Never

12. Have you ever purchased any of the following products? If so, have you purchased them more than once? Do you have any in your home at this time?

Product	Have <i>not</i> purchased	Have purchased once		Have purchased more than once	
		Have now	Do not have now	Have now	Do not have now
Dehydrated instant mashed potatoes					
Dehydrated scalloped potatoes					
Dehydrated au gratin potatoes					
Frozen french fries					
Frozen potato patties					
Frozen potato puffs					
Parboiled or converted rice					
Minute or instant rice					
Flavored rice mixes					
Frozen rice mixes					
Frozen macaroni or spaghetti dinners					
Canned macaroni or spaghetti					
Packaged macaroni or noodle dinners					
Packaged beef stroganoff					
Packaged noodles almonidine					

PART III: *We would now like to get some general background information about your household.*

1. How many persons are there currently living in your household? .....
  - a. How many adults aged 19 or over? .....
  - b. How many teenagers aged 13 to 18? .....
  - c. How many children aged 12 or under? .....
2. What is the age of the main earner? .....
3. a. What is the occupation of the husband (or main earner if no husband in household)?  
*(Note to enumerator—have respondent describe occupation.)*
  - b. Does he work full time ..... or part time .....
  - c. What is the occupation of the wife (include homemaker as an occupation)?  
*(Note to enumerator—have respondent describe occupation.)*
  - d. If employed outside the home, does she work full time ..... or part time .....
4. a. What was the last grade of school completed by the husband? .....
- b. What was the last grade of school completed by the wife? .....
5. Could you tell us which of these categories would best describe your yearly household income? *(Show card to respondent.)*
  1. Under \$3,000
  2. \$3,000–\$5,499
  3. \$5,500–\$6,999
  4. \$7,000–\$9,999
  5. \$10,000–\$14,999
  6. \$15,000 and over
  7. No answer

PART IV: *For enumerator to answer—Do not ask respondent*

6. Was the respondent
  1. Caucasian
  2. Negro
  3. Oriental
  4. Mexican-American
  5. Indian
  6. Don't know
  7. Other
7. Was the interview completed in
  1. Rural farm
  2. Rural nonfarm
  3. Urban
  4. Large metropolitan area
8. Would you describe the area as
  1. Low income
  2. Middle income
  3. High income
9. Was the residence
  1. A private home
  2. An apartment unit
  3. A duplex or attached house
  4. Mobile home
  5. Rooming or boarding house
  6. Other
10. Would you rate the appearance and upkeep of the house as
  1. Superior
  2. Standard
  3. Inferior
  4. Very inferior



## APPENDIX C: STATISTICAL SUPPLEMENT

This appendix consists of 13 large tables, the titles to which appear below. Photocopies of the tables, plus table B-2 may be obtained at their actual cost of reproduction (\$1.50) from:

Agricultural Publications  
University of California  
Berkeley, California 94720

Make checks or money orders payable to The Regents of the University of California. Send payment with order to the above address—not to the Regents.

Photocopies of the tables may be seen at the following libraries:

National Agricultural Library, Beltsville, Md.

Agricultural Reference Library—Giannini Hall, University of California, Berkeley

Bio-Agricultural Library—University of California, Riverside

University of California Library, Davis

### Table Titles

- B-2. Household Characteristics of Survey Respondents Cross-Classified by Income Level, Education of Wife, and Ethnic Group, Northern California, 1968.
- C-1. U. S. Per Capita Consumption of Certain Foods, 1910–1965, Pounds Per Year.
- C-2. Utilization of U. S. Potatoes, 1956–1967 Crops.
- C-3. Views About Whether Potatoes Are Fattening, Northern California, 1968.
- C-4. Substitutes Used to Replace Potatoes in the Diet, Northern California, 1968.
- C-5. Frequency of Eating Potatoes, Rice, and Macaroni Products at Home, Northern California, 1968.
- C-6. Frequency of Serving Rice in Atlanta, Dallas, and Denver, 1957.
- C-7. Frequency of Using Potatoes, by Household Characteristics, Northern California, 1968.
- C-8. Frequency of Using Rice, by Household Characteristics, Northern California, 1968.
- C-9. Frequency of Using Macaroni Products, by Household Characteristics, Northern California, 1968.
- C-10. Purchases of 15 Convenience Potato, Rice, and Macaroni Products, by Household Characteristics, Northern California, 1968.
- C-11. Purchases of Eight Convenience Potato, Rice, and Macaroni Products, by Income Level and Ethnic Group, Northern California, 1968.
- C-12. Purchases of Eight Convenience Potato, Rice, and Macaroni Products, by Income Level and Education of Wife, Northern California, 1968.
- C-13. Purchases of Eight Convenience Potato, Rice, and Macaroni Products, by Income Level and Household Size, Northern California, 1968.

Tables C-1, C-2, and C-6 contain secondary data taken from the sources indicated. Source references are omitted for the other tables since they summarize information gathered by the interviews conducted for this consumer survey.

Terms used in this survey and these tables are defined in Appendix A. Replies to all questions were not given by all 1,192 respondents. The number of nonresponses is indicated on some tables. Nonresponses are omitted, however, when their number is already given elsewhere or can be determined easily from the data tabulated.

When percentage distributions are computed, their sums do not always total 100.0 exactly because of rounding. The practice followed here was to modify the data for the components (slightly) to get “accurate” totals.

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Finally, this study would have been impossible without the active cooperation of those persons who generously furnished the detailed information requested for completing the questionnaires.

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